Videnskabelige Meddelelser

fra

Dansk naturhistorisk Forening i Kjøbenhavn

Bind 64.

Udgivne af Selskabets Bestyrelse.

Med 5 Tavler, 1 Kort og 103 Figurer i Texten.

Syvende Aartis fjerde Aargang.

Kjøbenhavn.

Bianco Lunos Bogtrykkeri.

1913.

Redaktionen af dette Bind er besørget af Dr. *Th. Mortensen*.

Indhold.

Forklaring af Tavlerne.

Tavle I. Fig. 1. *Scopelus glacialis* med snyltende Copepod (*Sarcotretes scopeli*) bærende den epizoiske Hydroid, *Ichthyocodium sarcotretis*. Fig. 2—6. *Ichthyocodium sarcotretis*. Fig. 7—10. *Sarcotretes scopeli*.

Tavle II. Fig. 1—26. *Sarcotretis scopeli*. Fig. 27. *Peroderma bellottii*. (Se Tavleforklaringen S. 30—32).

Tavle III. Aalelarver (Leptocephaler); se Tavleforklaringen S. 51.

Tavle IV—V. Hydroider (Sertularider); se Tavleforklaringen S. 316—318.

Oversigt

over

de videnskabelige Møder

i

Dansk naturhistorisk Forening

i Vinterhalvaaret 1911—12.

Den 27. Oktober 1911. Dr. *Th. Mortensen* holdt Foredrag om *Asteronyx Loveni.* (Se Afhandlingen „Über Asteronyx Loveni. M. Tr.“ i Zeitschr. f. wiss. Zoologie. Bd. CI. 1912. Festschrift für Ludwig).

Mag. sc. *Hj. Ditlevsen* gav Meddelelse om nordiske Annelider (se Afhandlingen „Annelids from the Danmark Expedition“. Medd. om Grønland. Bd. XLV. 1912). Prof. *Jungersen* bemærkede, at det mulig kunde vise sig, at den massevise Optræden af den epitoke Form af Scalibregma inflatum var afhængig af Maanefaserne, ligesom ved „Palolo“s og beslægtede Formers Optræden.

Den 10. November. Dr. *C. Wesenberg-Lund* og Dr. *A. Bøving* holdt Foredrag om Dytiscernes Biologi og Morphologi. (Se Afhandlingerne af *C. Wesenberg-Lund* „Biologische Studien über Dytisciden“ og *A. Bøving* „Studies relating to the anatomy, the biological adaptations and the mechanism of ovipositor in the various genera of Dytiscidae“. Intern. Revue der gesamt. Hydrobiol. u. Hydrogr., Biolog. Suppl., V. Serie 1912).

Den 24. November. Referatmøde. Dr. *J. C. Nielsen* gav Meddelelse om Dermatobia-Larven hos Mennesket (Ref. af *Aug. Busk's* Afhandling: On the rearing of a Dermatobia hominis Linnæus. Proc. Entomol. Soc. Washington XIV. 1912) samt foreviste fritbyggede Kager af Honningbien (se Afhandlingen i dette Bind). Cand. mag. *P. Krarup* gav Meddelelse om nyere Fund af Skeletdele af primitive Mennesker; hertil gjorde Docent *Stamm* og Pastor *Breitung* nogle Bemærkninger. Dr. *Th. Mortensen* foreviste en Del Dyreformer fra Skagerak og Trondhjemsfjorden, indsamlede af ham i Sommeren 1911.

Den 8. December. Dr. *C. G. Joh. Petersen* holdt Foredrag om Tangplanternes Mængde og Aarsproduktion ved de nordeuropæiske Kyster. Foredragsholderen viste ved Hjælp af den franske officielle Statistik, at det maa antages, at ved de franske og engelske Kyster kan der aarlig høstes op mod 12,000 Millioner kg. Alger, naar Frankrigs Kyster i Bretagne tages som Maalestok. Dette Tal er langt større end det Antal kg. Fisk, der aarlig fanges i disse Have, nemlig c. 1,300 Millioner kg. Af disse Fisk er over Halvdelen pelagiske Fisk, som Sild og Makrel, der maa antages at leve af Plankton. Han udtalte, at der snarere fiskes mere af den „demersale“ Fiskebestand end af Algebestanden, og at man fremtidig ikke kan lade denne ude af Betragtning, naar Talen er om at gøre Rede for Stofskiftet i Nordsøen, selv om der mellem Algerne og Fiskene maa indskydes et Gennemgangsled, Havbundens Invertebrater, der antages at leve af organisk Detritus, stammende fra Kystplanterne. — Foredragsholderen fremlagde en Tegning af en Rodstok af *Zostera*, og tydede denne som Bevis paa, at denne Plante producerer et langt større Antal Blade aarlig, end der tidligere var antaget.

I Anledning af Dr. *Petersens* Foredrag fremhævede Dr. *Kolderup Rosenvinge*, at de statistiske Beregninger over Algemængden ved de franske Kyster giver et langt mindre Beløb end det virkelige; dels tages Algerne kun paa visse Aarstider og kun paa de mere tilgængelige Steder, dels er det kun de til Formaalet passende Former, der tages. Paa Forespørgsel af Foredragsholderen oplyste Dr. *F. Børgesen*, at der er betydelige Mængder af Alger i tropiske Farvande. Dr. *Th. Mortensen* bemærkede, at der ogsaa er betydelige Mængder af Havgræs i tropiske Farvande, som afgiver Næring for Søkøer og Havskildpadder. Dr. *Ostenfeld* mente, at man ved ligefrem at afmeje *Zostera*'en maatte kunne faa direkte Bevis for, hvormange Blade den producerer aarlig.

Den 19. Januar 1912. Professor *Jungersen* holdt Foredrag om en Snyltekrebs med en epizoisk Hydroid. (Se Afhandlingen i dette Bind). Dr. *Mortensen* spurgte om, hvorledes Hudskiftet kunde foregaa hos indborede Snyltekrebs. Foredragsholderen bemærkede dertil, at der intet Hudskifte foregaar efter Indboringen: Chitinen udspiles og voxer ved Intussusception, saa Dyrets Vækst kan foregaa uden Hudskifte. Dr. *Bøving* spurgte om, hvorledes den epizoiske Goplepolyp kunde tænkes at faa sin Næring. Foredragsholderen mente, at det maatte ske gennem Munden: da den sidder paa en Chitinflade, kan det næppe tænkes, at det kan ske gennem Hydrorhiza.

Den 2. Februar. Referatmøde. Dr. *Mortensen* gav Referat af Prof. *Walcott's* Undersøgelser over cambriske Forsteninger („Cambrian Geology and Paleontology“. Smithson. Miscell. Coll. Vol. 57.

No. 2, 5). I Tilslutning hertil omtalte Docent *J. P. Ravn*, hvad der hidtil kendes af præcambriske Forsteninger. Endvidere foreviste Dr. *Mortensen* nogle mærkelige Echinodermlarver (*Auricularia „nudibranchiata“* fra Japan). Mag. sc. *Hj. Ditlevsen* gav Meddelelse om Eddikeaalens (*Anguillula aceti*) Optræden i det frie, i udflydende Saft af Træer. Professor *Jungersen* foreviste nogle Snyltekrebs af Lernæernes Familie (*Lernæonicus sprattæ* og *L. encrassicholi* samt *Peroderma bellottii*) og refererede *Quidor's* Opfattelse af Dværghannernes Omdannelse hos Lernæopodider og Chondracanther (C. R. 1811). Dr. *V. Nordmann* foreviste *Panopea norvegica* fra Dansk Farvand.

Den 16. Februar. Dr. *Th. Mortensen* holdt Foredrag om *Tjalfiella tristoma*, en fastsiddende Ribbegople fra Grønland. (Se „Ctenophora“, the Danish „Ingolf“-Expedition. V. 2. 1912). Professor *Jungersen* bemærkede, at Slimafsondringen hos *Tjalfiella* kunde muligvis være Værn mod *Umbellula's* Nældeceller, samt gjorde, i Anledning af *Tjalfiella's* Regenerationsevne, opmærksom paa *Lang's* Afhandling om *Gastroblasta Raffaellii*.

Den 1. Marts. Lærer *J. P. Kryger* gav Meddelelse om *Oophthora*, en Slægt af de trimere Chalcidiers Gruppe. Mag. sc. *K. Henriksen* gjorde i Anledning heraf opmærksom paa nogle Undersøgelser af *Silvestri*, som ligeledes har iagttaget det mærkelige Forhold, at der baade er vingede og uvingede Hanner hos denne Slægt, medens det omvendte er Tilfældet hos *Prestwichia*.

Dr. *Th. Mortensen* gav Meddelelse om nordiske Ribbegopler. (Se „Ingolf“ Ctenophora. Part. II.).

Den 15. Marts. Dr. *C. Wesenberg-Lund* holdt Foredrag om Parrings- og Æglægningsforholdene hos Guldsmedene. (Vil blive publiceret i Internat. Revue d. ges. Hydrobiol. u. Hydrographie. 1913).

Den 29. Marts. Referatmøde. Cand. mag. *H. Blegvad* foreviste nogle smaa Aalelarver fra Atlanterhavet (se Afhandlingen i dette Bind). Mag. sc. *Ferdinandsen* holdt Foredrag om vort nuværende Kendskab til de saakaldte *Ambrosia*-Svampe (Svampe som dyrkes af Termiter, Myrer o. a.). Docent *Stamm* foreviste en Samling Æg af Havtæger (*Halobatidae*), som var fundne fæstede til forskellige i Havet drivende Genstande, saasom en Sepiaskal, en Korkstump, en Fjer o. l., og, tildels for mange Aar siden, var hjembragte til Zoologisk Museum; desuden en i Privateje beroende Terne (*Anous stolidus* [L]), som var skudt i November 1911 i det røde Hav; dens Halefjer var besatte med Hundreder af Æg af samme Størrelse og Udseende som de førnævnte og derfor uden Tvivl ligeledes tilhørende en Havtæge. Dr. *Th. Mortensen* foreviste en mærkelig Holothurie (*Rhopalodina*). Docent *J. P. J. Ravn* holdt Foredrag om præcambriske Forsteninger.

Den 19. April. Professor *V. A. Poulsen* gav Meddelelse om den anatomiske Bygning af Løgkagen af *Urginea maritima.*

Docent *A. Krogh* gav Meddelelse om Undersøgelser over Blodets Kredsløb. (Se Afhandlingen: Measurements of the Blood Flow through the Lungs of Man, by *August Krogh* and *J. Lindhard.* Skandinavische Arch. f. Physiologie. Bd. XXVII. 1912).

Beretning om de i Sommeren 1912 af Dansk naturhistorisk Forening foretagne Excursioner.

2.—3. Juni. Ornithologisk Excursion til Faaborg og Omegn, sammen med Dansk Ornithologisk Forening; under Ledelse af Overlæge *O. Helms.*

Man rejste fra København Søndag Morgen d. 2. Juni; undervejs stødte Deltagere fra andre Egne af Landet til, og Kl. 1½ mødtes Selskabet i Korinth med de fynske Fuglevenner, som havde paataget sig at fremvise Egnens Fugleliv for de to Foreninger.

Med stor Elskværdighed havde de fynske Værter stillet Vogne til Raadighed for Deltagerne, som nød en prægtig Køretur gennem Brahetrolleborgs og Holstensbus' Skove til Faaborg. Vejret var det skønnest tænkelige, og talrige Fugle saas og hørtes undervejs:

Vibe (*Vanellus cristatus*), Ringdue (*Columba palumbus*), Spurvehøg ♀ (*Astur nisus*), Gøg (*Cuculus canorus*), Forstuesvale (*Hirundo rustica*), Hvid Vipstjert (*Motacilla alba*), Skovpiber (*Anthus trivialis*), Lærke (*Alauda arvensis*), Tornsanger (*Sylvia cinerea*), Havesanger (*Sylvia hortensis*), Gulbug (*Hypolais icterina*), Løvsanger (*Phyllopseustes trochilus*), Grøn Løvsanger (*Phyllopseustes sibilatrix*), Rødhals (*Erithacus rubecula*), Musvit (*Parus major*), Sortmejse (*Parus ater*), Halemejse (*Parus caudatus*), Bogfinke (*Fringilla coelebs*), Gulspurv (*Emberiza citrinella*), Spurv (*Passer domesticus*), Stær (*Sturnus vulgaris*), Raage (*Corvus frugilegus*) og Krage (*Corvus cornix*).

I Price's Have lige ved Faaborg indtoges en lille Forfriskning, hvorefter man tilfods begav sig over „Sundet" ved Faaborg ned til Havnen. Undervejs holdt Overlæge Helms et interessant Foredrag om Sundets tidligere og nuværende Fugleliv: Jagten er nu lejet af en lille Forening af stedlige Fuglevenner, som freder Stedet. Desværre findes Rørdrummen, der tidligere opholdt sig her, ikke mere, men man haaber, at den igen vil sætte Bo, naar her som nu er uforstyrret Fred. Rørbevoxningen var saa høj, at Fuglene var vanskelige at se, men nogle saas og hørtes dog.

Stokand (to Hanner og en Hun svømmende med Ællinger) (*Anas boscas*), Hættemaage (*Larus ridibundus*), Dværgtærne (*Sterna minuta*), Stork (*Ciconia alba*), Vibe (*Vanellus cristatus*), Digesvale (*Hirundo riparia*), Mursejler (*Cypselus apus*), Hvid Vipstjert (*Motacilla alba*), Rørsanger (*Acrocephalus arundinaceus*), Rørspurv (*Emberiza schoeniclus*).

Ved Ankomsten til Havnen viste det sig nødvendigt paa Grund af Blæst og Højvande at gøre en lille Forandring i Planen, saaledes at den ventende Damper i Stedet for at sejle til Bjørnø, som Hensigten havde været, førte Deltagerne ud til nogle smaa Holme Øst for samme, hvor man gik fra Borde i de der ventende Baade.

Paa Holmene fandtes ynglende Storm- og Hættemaager (*Larus canus* og *ridibundus*), Hætte- og Kysttærner (*Sterna hirundo* og *macrura*) samt Strandskade (*Hæmatopus ostrilegus*); Raage (*Corvus frigilegus*) og Digesvale (*Hirundo riparia*) saas flyvende over.

Ved Tilbagekomsten til Faaborg havde man saa god Tid inden Middagen, at det viste sig muligt at aflægge et Besøg paa Faaborg Museum, hvor man bl. a. havde Lejlighed til at beundre en Del af Johannes Larsens smukke Billeder af Fugle.

Paa Hotellet indtoges derefter Middagen og ved Kaffen og Cigaren havde man endnu den Nydelse at se Lysbilleder af Direktør Rubows smukke Maagefotografier fra Egholm. Hr. Rubow havde været saa venlig at paatage sig den Ulejlighed at medbringe Billederne, og bistaaet af stedlige Lyskræfter skaffede han saaledes Deltagerne en Fornøjelse i Tilgift, som paaskønnedes meget.

Man gik tidlig til Ro, dels i Hotellet, dels hos Medlemmerne rundt i Byen, som med stor Gæstfrihed havde aabnet deres Hjem for de Tilrejsende, og næste Morgen Kl. 9 mødtes man paany ved Havnen for at sejle ud til Sanatoriet ved Nakkebølle Fjord. Desværre regnede det temmelig stærkt under Sejlturen, men ved Ankomsten derud var Regnen heldigvis ophørt, og Selskabet modtoges med største Gæstfrihed af Overlæge Helms og hans elskværdige Familie. Efter at Overlægen havde budt Velkommen paa Sanatoriets Enemærker og sagt nogle forklarende Ord om det Fugleliv i Skov og Park, som Deltagerne skulde have Lejlighed til at se, delte man sig i to Hold og krydsede i et Par Timer rundt i Egnen. Det var fornøjelige Ting, man fik at se, og navnlig fik man et godt Indtryk af, hvor let det er at knytte Fugleliv til sig, naar man vil gøre lidt derfor. Desværre forbød Vejret og Tidens Knaphed en længere Udflugt til den inddæmmede Del af Nakkebølle Fjord. Hvad angaar de iagttagne Arter henvises til *O. Helm's* Artikel „Lidt om Ynglefuglene paa Sanatoriet ved Nakkebølle Fjord i Foraaret 1012“; Dansk Ornithol. Forenings Tidsskrift, 6. Aarg. H. IV. p. X.

Kl. 12 samledes man hos den utrættelige Vært og Værtinde til Frokost, og med taknemmelige Følelser mod de fynske Værter kørte Deltagerne derefter i de ventende Vogne til Pejrup Station for med Jærnbanen at spredes igén over Landet, hver til sit efter et Par Dages behageligt Samvær.

E. L. S.

Den 9. Juni. Excursion til Grib Skov. Emne: Myreboer og Myregæster. Ledere: Mag. sc. *K. Henriksen*, Lærer *J. P. Kryger* og Partikulier *J. P. Johansen*.

Deltagerne (18) samledes i Hillerød og kørte med Vogne til Grønholtvang, hvor Boerne af den mørkebrune *Formica fusca* (under Sten) og den

begsorte, aromatisk lugtende *Lasius fuliginosus* (udgnavet i et endnu levende Træ) iagttoges. Navnlig det sidste Sted fandtes der ved Sigtning i Boets nærmeste Omkreds foruden Myrmekophiler adskillige Skovbundsdyr (*Campodea* o. a.). Af Myrmekophiler fandtes hos *L. fuliginosus* følgende Biller: *Myrmedonia humeralis* og *laticollis*, *Oxypoda notata* og *ferruginea*. — Vognene kørte derpaa Deltagerne til Nøddebo Kro, hvor der spistes Frokost. Derfra gik Turen til Fods op i Grib Skov, hvor man i Skovbrynet ud mod en Mark undersøgte Tuer af *Formica pratensis*, en mørk Race af den almindelige røde Tuemyre, *F. rufa*, og ligesom denne samlende en Stak, men ikke saa høj, af Grannaale over de i Jorden gravede Gange, hvori fandtes *Polyxenus* og mange myrmekophile Biller: *Thiasophila angulata*, *Notothecta flavipes* og *anceps*, *Homalota talpa*, *Oxypoda hæmorrhoa*, *Dendrophilus pygmæus*, *Myrmetes piceus*, *Myrmecoxenus subterraneus* og *Platyarthrus Hoffmannseggi*, samt den lille Myre *Formicoxenus nitidulus*, der anlægger sit — uafhængige — Bo inde i Tuemyrens Tuer. — Samme Sted fandtes under Sten Boerne af den lille gule *Lasius flavus* og af Stikmyren *Myrmica rubra*.

Hos vore danske Myrer findes en 4de Type at bygge paa, de med Tiden ret kompakte Jordtuer, som *Lasius niger* og *flavus* danner paa Enge med rig Græsvæxt; men af den saas paa Grund af den knappe Tid ikke gode Exempler.

Ved Bankning paa Egene fandt man derimod adskilligt interessant; saaledes forskellige Sommerfuglelarver, belagt med Æg eller Larver af Snyltefluer (Tachiner).

Efter et fornyet, men kort Ophold i Nøddebo Kro sejlede man med Motorbaaden til Fredensborg, hvorfra Deltagerne med Toget tog tilbage til København.

K. H.

Den 25. August. Excursion til Storebælt med Biologisk Stations Damper „Sallingsund“, under Ledelse af Direktør for Biologisk Station, Dr. *C. G. Joh. Petersen.*

Deltagerne (16) gik ombord i „Sallingsund“ i Nyborg ved 12-Tiden. Man sejlede først til „Hvide Grunde“, hvor der fiskedes med Tobis-Vaad paa Zostera-Bund. Udbyttet af denne Fangst var *Gobius flavescens*, Tangsnarre, Hundestejle, forskellige Naalefisk, Aal; *Idothea* og *Rissoa* — en typisk Zostera-Fauna, hvoriblandt dog savnedes enkelte Former, som den lille *Psammechinus miliaris*, der andetsteds kan findes i uhyre Masser i Zostera'en.

Paa nogle Fiskekroge, der i Forvejen var udsatte af Stationens Mandskab, røgtedes nu og gav en interessant Fangst af Torsk, Hajer (*Acanthias vulgaris*), Rokker (*Raja radiata*), samt store Søstjærner (*Asterias rubens* og den pragtfulde Søsol, *Solaster papposus*).

Man sejlede derefter længere ud i Bæltet, hvor der foretoges Skrabninger paa forskellig Slags Bund til Paavisning af Fauna'ens forskellige Karakter paa haard og blød Bund. Paa den haarde Bund fandtes særlig Svampe, Balaner, *Buccinum*, Pagurer, Hydroider, Capreller, og især Echi-

nodermer: *Strongylocentrotus drøbachiensis, Cribrella sanguinolenta, Solaster papposus* og *Ophiopholis aculeata.* — Paa den bløde Bund, med megen død Zostera, fandtes *Astarte compressa* og *elliptica, Cyprina islandica, Leda* sp., *Doris* sp., *Diastylis Rathkei* og forskellige Orme, Skælrygge, *Nephthys,* Rørorme. Bundprøver toges med Bundhenteren, til Paavisning af Mængdeforholdet af de forskellige paa den bløde Bund levende Dyr; det viste sig, at de to *Astarte*-Arter var langt de talrigste, idet de fandtes i uhyre Masser i hver Prøve.

Et Træk med Togg-Vaad gav kun ringe Udbytte: en Mængde smaa Isinger, men kun en enkelt større Ising og Rødspætte. Tidligere var her Mængder af store Rødspætter, men de er nu helt opfiskede ved det intense Fiskeri, der har været drevet i Bæltet i de senere Aar. Prøver af Plankton toges, men det viste sig at være fattigt, indeholdende væsentlig kun *Ceratium tripos* og nogle Smaagopler.

Efter Afslutningen af Undersøgelserne sejledes der til Korsør. hvor Deltagerne landsattes i rette Tid til at naa Iltoget til København.

Denne Tur havde særlig Interesse ved Sammenligningen mellem Storebælts og Øresunds Fauna, hvilket sidste man havde Lejlighed til at lære at kende ved Excursionen med „Sallingsund" i 1910. At Sundets Fauna er langt den rigeste har jo sin naturlige Forklaring i, at den dybe Østerrende i Kattegat fortsætter sig direkte ned i Øresund, helt til Hven, saa hele den rige Fauna fra det dybe Kattegat har fri Adgang hertil — medens Storebælt og hele det sydvestlige Kattegat ved grundere Vand er adskilt fra det østlige Kattegat, saa en hel Række af de i det østlige Kattegat forekommende Former er afskaarne fra at komme ned i Storebælt.

Foreningen kan ikke noksom udtrykke sin Erkendtlighed for den Adgang, Dr. *Petersen* har ydet og forhaabentlig ogsaa i Fremtiden vil yde Medlemmerne til at lære vor marine Fauna og vore Farvandes Biologi at kende, hvilket ellers kun de færreste har Adgang til.

Th. M.

Den Schibbyeske Præmie.

Præmien for 1912 er ikke bleven uddelt, da intet af de indleverede (geologiske) Arbejder fandtes egnede til Prisbelønning.

On a new Gymnoblastic Hydroid *(Ichthyocodium sarcotretis)* epizoic on a new Parasitic Copepod *(Sarcotretes scopeli)* infesting *Scopelus glacialis* Rhdt.

By

Hector F. E. Jungersen.

(With Pl. I and II.)

About two years ago one of my pupils, Mr. Blegvad — now Cand. mag. — handed over to me a specimen of *Scopelus glacialis* with a most remarkable parasite, asking me what the latter might likely be. The fish with the strange guest had been captured in August or September 1906 in the depth of the Atlantic off the S. W. coast of Ireland by the Danish steamer "Thor", on an investigation cruise in which Mr. Blegvad took part as assistant naturalist. I was not able to answer the question immediately and laid the specimen aside for closer examination later. This examination I have only recently found time to make. The parasite (Pl. I, Fig. 1) at first sight appears made up of a stem and a large number of branchlets. The stem is stout, when viewed with a strong lens densely striated transversely; it narrows somewhat abruptly into a short slender stalk inserted into the body of the fish. Both sides and the face looking towards the fish are covered with a great number of quite soft structures resembling papillæ; the whole thing bears a superficial likeness to an "*Eolis*". At first I thought it might be a *Pennella*, but the soft and irregularly grouped papillæ did not show any great likeness to the firmly cuticularized, branched and symmetrically arranged appendages of a *Pennella*. Closer examination of some of the larger and stouter "papillæ", which had fallen off from the sides of the stem, revealed the structure of Medusæ, and a slender "papilla" from the inner face

of the parasite turned out to be a Polype with medusæ-buds in various stages of development. Thus the question evidently was of some colony of Hydroids; but the stem soon turned out to be, not a part of a Hydroid, but of a Parasitic Copepod, belonging to the family of *Lernœidœ.* Without destroying the beautiful specimen given by Mr. Blegvad, I reached this conclusion from a thorough search for parasites in the rich collection of *Scopelini* from the Atlantic, which our Museum had obtained from the steamer "Thor". More than two thousand specimens of *Scopelini* were examined for this purpose; I succeeded in finding 6 other specimens of the "combined parasite"; some of these had egg-strings — or remnants of egg-strings — still adhering, and thus did not leave any doubt about the nature of the "stem". The new material did not contain any specimen so richly developed as the first one, but on the other hand it yielded developmental stages both of the Hydroid and of the Parasitic Copepod. Especially the latter seem to me of some value as a supplement to what has been known hitherto of the metamorphosis of some other *Lernœidœ (Lernœa, Pennella).*

My material, further, shows that the association of the Hydroid with the Parasitic Copepod is not a "necessary" one, in so far that the parasitic Crustacean may be found without the Hydroid; on the other hand, I never found the Hydroid without the Copepod, though the fact is not unknown that some Hydroids grow directly on the body of fishes (2; 7 a, b; 13; 20 a; 8, 9).

That the association is not an accidental one seems to be proved by the fact that a proportionally large number of the Parasitic Copepod carry the Hydroid. 22 specimens of the Copepod in its final form, inserted into the body of the fish, were found; but of these 8 are very young and the part protruding outside the fish is so small, that it could not be expected beforehand, that any Hydroid should attach itself upon it; of the remaining 14 large and adult specimens just half the number bear the Hydroid.

The Copepod, consequently also the association, appears to be bound to a single species of host, *Scopelus glacialis* Rhdt.; and

only on the same fish have been found all the developmental stages which precede that of insertion into the body of the host. As already mentioned I have examined a great number of *Scopelini* and allied forms from the Atlantic, between 2 and 3 thousand specimens, but I have never found this parasite — nor any other Parasitic Copepod — on other species of the genus *Scopelus* (taken in its widest sense as comprising *Rhinoscopelus*, *Myctophum* etc.) nor on species of genera like *Cyclothone*, *Argyropelecus*, *Maurolicus*, *Stomias* etc., which were captured by the "Thor" often in numbers together with *Scop. glacialis* on the same stations. The parasite in question has only been taken by the "Thor" in the part of the Atlantic lying between 48° 15′ Lat. N. and 65° Lat. N., and between 4° 33′ Long. W. and 28° 10′ Long. W., always in a considerable depth — from 100 to 600 met. below the surface. By the ship "Tjalfe", on a surveying expedition to the Greenland waters under supervision of Mr. Ad. Jensen, only a single (young) specimen was captured farther west, sc. at 48° 26′ Long. W., 60° 07′ Lat. N. In the Davis-Strait it seems not to occur; among some 330 specimens of *Scop. glacialis* collected by the "Tjalfe" W. of Greenland, between ca. 63° and 71° Lat. N., none were found infested. In collections made by the "Thor" in the Atlantic south of the above named boundary I did not find the parasite; and it is likewise wanting on the numerous *Scop. glacialis* collected by the "Thor" in the Mediterranean. In the latter this fish and — less often — two other species of *Scopelus* were found infested with an allied Parasitic Copepod *Peroderma bellottii;* but on this I never found any Hydroid.

That our parasite is by no means of frequent occurrence seems to be proved by the fact that to yield the 22 above-named specimens more than 1800 specimens of *Scopelus glacialis* had to be examined.

For the sake of completeness all the localities for the material examined are given below.

1. The association of the Parasitic Copepod with the Hydroid.

"Thor"s Station No.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
286.	61° 49′	14° 11′	1000	400	$^{2}/_{9}$ 04.
164.	61° 20′	11° 00′	1300	150	$^{29}/_{8}$ 05.
124.	61° 04′	4° 33′	1075	500	$^{23}/_{7}$ 05.
89.	55° 45′	9° 35′	1600	100	$^{23}/_{6}$ 06.
185.	51° 56′	11° 55′	350—640	150—450	$^{8}/_{9}$ 06.
93.	49° 23′	12° 20′	ca. 1300	100	$^{5}/_{6}$ 05.
?	S. W. of Ireland		?	?	? 06.

2. The Parasitic Copepod, without the Hydroid.

"Thor"s Station No.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
152.	65° 00′	28° 10′	1240	400	$^{19}/_{6}$ 04.
286 (2 spec.).	61° 49′	14° 11′	1000	400	$^{2}/_{9}$ 04.
124.	61° 04′	4° 33′	1075	500	$^{23}/_{7}$ 05.
89.	55° 09′	9° 35′	1600	100	$^{23}/_{6}$ 06.
182.	50° 11′	12° 05′	2200	150	$^{4}/_{9}$ 06.
76 (3 spec.).	49° 27′	13° 33′	2600	400	$^{11}/_{6}$ 06.
93.	49° 23′	12° 20′	ca. 1300	100	$^{5}/_{6}$ 05.
88 (2 spec.).	48° 09′	8° 30′	600	150	$^{20}/_{6}$ 05.
87.	48° 05′	8° 29′	2000	150	$^{20}/_{6}$ 05.
"Tjalfe"s St.No.					
321.	60° 07′	48° 26′	? (but more than 2000)	300	$^{3}/_{5}$ 09.

3. Stages of Development of the Parasitic Copepod (Cyclops-stage and Pupæ)

"Thor"s Station No.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
	A. (Cyclops-stage).				
80.	51° 34′	11° 50′	1140	500	$^{16}/_{6}$ 06.
93 (2 spec.).	49° 23′	12° 20′	ca. 1300	100	$^{5}/_{6}$ 05.
	B. 1st Pupal Stage.				
285.	62° 49′	18° 46′	1000	250	$^{1}/_{9}$ 04.
80.	51° 34′	11° 50′	1140	500	$^{16}/_{6}$ 06.
93.	49° 23′	12° 20′	ca. 1300	100	$^{5}/_{6}$ 05.
63.	48° 09′	8° 36′	?	?	?
	C. 2nd Pupal Stage.				
88.	55° 05′	12° 20′	2000	100	$^{22}/_{6}$ 06.
177.	49° 30′	11° 38′	550	150	$^{1}/_{9}$ 06.
76 (4 spec.).	49° 27′	13° 33′	2600	400	$^{11}/_{6}$ 06.
178.	48° 04′	12° 40′	4000	500	$^{2}/_{9}$ 06.

"Thor"s Station No.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
	D. 3rd Pupal Stage.				
152.	65° 00′	28° 10′	1240	500	19/6 04.
285.	62° 49′	18° 46′	1000	?	1/9 04.
88.	55° 05′	12° 20′	2000	100	22/6 06.
80.	51° 34′	11° 50′	1140	500	16/6 06.
175.	51° 11′	11° 41′	575	100	30/8 06.
76.	49° 27′	13° 33′	2600	400	11/6 06.
93 (2 spec.)	49° 23′	12° 20′	ca. 1300	100	5/6 05.
	E, 4th Pupal Stage.				
230.	63° 10′	7° 31′	1090	600	3/8 04.
88.	55° 05′	12° 20′	2000	100	22/6 06.
76 (3 spec.).	49° 27′	13° 33′	2600	400	11/6 06.
93 (7 spec.).	49° 23′	12° 20′	ca. 1300	100	5/6 05.

I. The Parasitic Copepod.

1. The adult female (Pl. I, Figs. 7—10).

The female parasite is sunk into the body of the fish, leaving outside of the host its posterior part, which is larger or smaller according to the age and development of the parasite. The infested *Scopelus glacialis* are from 20 to 57 mm. in length, mostly less than 30 mm. In most cases the parasite is seen projecting from the dorsal part of the fish (i. e. above the lateral line), most often in front of the dorsal fin (of the 22 specimens 16 penetrate dorsally, of these again 13 in front of the dorsal fin; 6 are attached ventrally). The greater number is found on the right side (11 on the right, 7 on the left side, 4 just in the middle line). With its anterior part it penetrates through the body wall to the intestines of the host; the posterior, visible part is largest and stoutest in egg-bearing individuals, but the length of the hidden, internal part does not always correspond to that of the external: to reach the intestines the individuals which protrude near the dorsal middle line, especially those fixed behind the dorsal fin, have a longer way to penetrate than those attached ventrally. In egg-bearing females the external part is generally club-shaped; near

the surface of the fish it narrows more or less abruptly into a slender stalk, sunk through a kind of vault of the skin deeper into the tissues of the host; in length it varies from 3 to 7 mm., with a largest diameter of from 1,5 to 2 mm. The position of the genital openings, carrying the egg-strings, shows that the ventral side of the parasite looks towards the surface of the fish. The egg-strings seem rather variable in length: in one specimen, the external part of which measured 4 mm. in length, 1,5 mm. in breadth, they were only 7 mm., although quite complete; in another specimen, where the external part measures 7 mm. in length, the egg-strings — though deprived of their outer ends — are 22 mm. They are cylindrical, the eggs flat, arranged in a single row like coins in a rouleau, — as in other *Lernœidœ.* The eggs are light yellow or greenish-yellowish. The external part of the parasite is generally somewhat chocolate-coloured from brown pigment, arranged in smaller or larger specks and longitudinal stripes. Young individuals, still without eggs, appear unpigmented, whitish. Through the cuticle part of the intestine, the ovaries, oviducts and cementing glands may be seen. The part hidden in the tissues of the host is yellowish with numerous drops of oil shining through. The length and shape of this internal part varies a good deal. One specimen, projecting near the middle line of the back in front of the dorsal fin of a fish of 42 mm. length, reached through the muscles, past the vertebral column, between two ribs to the small intestine; its total length is ca. 13 mm., 7 hidden in the fish, 6 external; the part passing the muscles form a slender stalk of ca. 5 mm. length. Of another specimen, ca. 9 mm. in total length, and attached between the right ventral fin and the posterior pectoral light-spot of a *Scop. glac.* 33 mm. in length, about half the length appeared externally, but the slender stalk which had only a thin layer of muscles to penetrate, has only a length of 0,6 mm. Just inside the body wall the parasite broadens evenly towards the anterior end; following the curvature of the posterior appendix pylorica it reached under the air-bladder and right lobe of the liver to the

oesophagus. A third individual (still unpigmented and without eggs). fixed near the back on a line with the root of the pectoral fin of a fish, 55 mm. in length, only protruded with 4,8 mm. externally, while 8,2 mm. were hidden in the host. It went nearly straight down through the muscles, curved in front of the right pronephros over the upper pharyngeal bones and had its anterior end lying in front of the left pronephros, with the sucking apparatus close to the jugular vein. The greater part of the internal portion of this specimen is narrow and slender.

In all specimens examined the anterior part sends out from each side a large, clumsy process, generally shaped like a cushion (Figs. 7, 8, pr.); sometimes more as a sausage (Fig. 10 pr.); behind the processes follows an elongated, straight or curved portion, tapering gradually into a stalk and at the same time acquiring a more and more thick cuticle; outside the host it widens — sometimes abruptly — into the ovoid part, carrying the genital openings with the egg-strings. Behind the latter a short conical part may be more or less pronounced and feebly bent dorsally.

The anterior part with the two large lateral processes is the cephalothorax; in front of the processes are seen two pairs of antennæ, the mouth-sipho, maxillæ and one pair of maxillipeds (according to some authors = the second pair of maxillæ); immediately behind the cephalothorax a very short part of the elongated portion represents the abdomen (or thorax), composed of three, still quite discernible segments; the two anteríor of these are provided each with a pair of feet, while an anterior pair of feet takes origin from the cephalothorax. By far the greatest portion of the whole parasite is made up by the enormously developed genital segment. as in other *Lernæidæ;* the remaining part of the postabdomen, probably only representing a single segment, is the above-named small conical end.

Closer examination of the anterior part shows that most of the Copepod-structure is pretty well preserved; the shape of the dorsal shield is quite recognizable; below its anterior margin a

longitudinal thickened ridge to strengthen the antennæ runs from the base of the latter to below the antennules: from here a similar, but longer and curved, thickened line runs up over part of the dorsal shield towards the middle line, without reaching its fellow from the opposite side (*l*, Fig. 8). No eyes are visible.

The antennules (a_1) are short, indistinctly segmented (probably 4 segments), along the front margin and at the distal end provided with setæ; especially the distal ones are fairly long. The antennæ (a_2) are cheliform, composed of 3 segments. The basal segment is strengthened by chitinous ridges; the terminal segment or movable finger of the chela is sickle-shaped, its point acting against a fairly strong process from the middle segment; the latter has between this process and the articulation for the terminal claw a thin low crest or keel. Below the front end of the cephalothorax protrudes the large sipho (*si*), strengthened at the base on each side by a chitinous ridge, running backwards past the origin of the maxillipeds (*l*, Fig. 8). The mouth-opening is funnel-shaped; the margin of the funnel appears slightly haired owing to numerous chitinous striæ radiating on its inner face; two small pointed processes project from its dorsal wall (the upper lip); besides, the points of the mandibles are seen in the interior of the sipho. The outer portion of the latter, behind the funnel, is strengthened by chitinous rings, one of which is stronger than the others.

On each side of the base of the sipho is seen the maxilla (*mx*) (maxillula), short, clumsy and ending with two strong setæ. The maxillipeds (or second pair of maxillæ) consist each of 3 segments; the front margin of the basal segment carries a denticle, about at the middle; distally on the outer side of the second segment is found a similar, but smaller denticle; the terminal segment is sickle-shaped and obliquely striated (owing to densely set hairs or lamellæ). A pair of second maxillipeds is wanting.

The large "anchor-processes" (*pr*) originate below the margins of the dorsal shield.

As in other Parasitic Copepods the foremost abdominal (or thoracic)

segment is coalesced with the cephalothorax. Three free terga for the other abdominal segments are developed, decreasing in size backwards, the hindmost being quite narrow. Generally, quite fine transverse lines may be traced from the front margins of the terga running across towards the ventral side; sometimes also a similar line may be traced from the anterior segment, coalesced with the cephalothorax.

Of the 3 pairs of abdominal (or thoracic) feet the two anterior possess two rami, the last pair only one ramus (Fig. 10). Each ramus is bisegmented. The distal segment carries 7 (that of the last pair only 6) setæ with extremely delicate plumules; the outermost seta is shorter than the rest. The proximal segment carries one seta on its inner corner; this seta is long on the outer ramus, short on the inner. The basal segment of each foot has a seta at its outer end, just outside the articulation for the outer ramus. On the ventral margin of the basal segment of the first pair, medially to the origin of the inner ramus, is found a quite short seta. As already stated, the first pair of feet originates from the cephalothorax, the second from the first free abdominal segment, the third from the second; while the third segment is without feet. Ventrally between the feet sterna are developed, with a strong transverse ridge joining the members of each pair. In front of the first pair is a Y-shaped thickening on the cephalothorax; and behind the last pair a thickened transverse line on the abdomen.

The elongated genital segment is densely striated transversely (this structure disappears on treating with a solution of potash). The genital openings are provided with strong chitinous lips (Fig. 9, *o*); between them a spot is always observed, possibly where the copulatory openings have once been (Fig. 9*). The last postabdominal segment carries on each side of the anus a small wart, evidently the furcal appendage, but completely devoid of setæ (Fig. 9, *f*).

Young stages, still unpigmented and pale, do not project with more than ca. 0,8 to 2,5 mm. outside their host. Closer examin-

ation shows that they deviate still less from the Copepod-shape than do the adults. I shall describe these stages later, comparing them with the stages of metamorphosis which precede the state of insertion into the body of the fish.

That our parasite belongs to the family *Lernæidæ* is evident; in many points it agrees with genera like *Pennella*, *Lernæa*, *Lernæenicus* and *Peroderma.* The 3 first-named possess 4 pairs of abdominal feet, the two anterior biramous, the two posterior uniramous; for this and other reasons the new parasite will hardly be accepted into any of these genera; more likely it might be included in the genus *Peroderma*, as the latter has only 3 pairs of swimming feet; but as we shall see presently, various structural differences seem to justify the establishing of a new genus and species for our parasite. I propose for it the name: *Sarcotretes scopeli*, and give the following diagnosis:

Sarcotretes n. g. Body elongated; the middle portion of the genital segment constricted into a narrow, firmly chitinized stalk, only the distal, claviform part behind the stalk projecting outside the host; antennules linear; antennæ cheliform; one pair of maxillipeds; three pairs of abdominal feet, the two anterior biramous, the posterior uniramous; three free abdominal segments with terga and ventral sterna well developed.

S. scopeli n. sp. Cephalothorax with two large, thin-walled (ventro-) lateral outgrowths; no other outgrowths present. Dorsal shield fully preserved, oblong, with an upper chitinous curved line on each side; other chitinous stripes under the front margin, and along the base of the sipho; tergum of hindmost abdominal segment small and narrow.

Inserted into the body of *Scopelus glacialis*, the body wall of which it pierces, penetrating to the alimentary tract.

The genus *Peroderma* was established by Heller (1865, 10. p. 250) for the species *P. cylindricum* (l. c. Pl. XXV, Fig. 6), which penetrates the lateral muscles of the Pilchard in the Mediterranean. H.'s description and figure were rather incorrect and were improved

by Richiardi (1875, 18 a). In the meantime Cornalia had named the same parasite *Taphrobia pilchardi* (5) without describing it better; both Heller and Cornalia only had one specimen at their disposal, and that of Heller was damaged. Richiardi showed that this parasite at its anterior end is provided with a system of branched appendages; he described antennæ, maxillipeds, swimming-feet etc. and gave a new diagnosis of the genus. Later (1881, 12 b) Richiardi briefly described a second species, *P. petersi*, deeply implanted into the body of *Gobius buccatus* C. V., and a third one (1882, 18 c) *P. bellottii*, inserted into the branchial arterial stem of *Scopelus benoiti*. The latter species I think is identical with that figured on Pl. II, Fig. 27, as this agrees in every essential point with the short description by Richiardi (as far as I know, the more complete description and the figure promised by R. (18 c, p. 150 and 475) have never been published)[1]. I found this parasite in numerous adult specimens on *Scopelus glacialis* and *Sc. rafinesquii*, collected by the "Thor" in the western part of the Mediterranean, in, and close to, the Straits of Gibraltar (on Station 99 of 96 specimens of *Sc. glacialis* 28 were infested, of 46 specimens of *S. rafinesquii* only 3; on Stat. 59 one specimen among 149 *Sc. glacialis*, and one among 5 *Sc. rafinesquii* carried the same; and on St. 61 (in the Strait itself) one of 2 *S. rafinesquii*)[2]. It is always attached to the same spot of the host, namely under the isthmus, with the posterior end, bearing the egg-strings, pointing backwards and the ventral side looking towards the belly of the

---

[1]) Brian (3, p. 94) repeats Richiardi's description, and only adds the following: "Due esemplari sporgenti fuori dell' angolo boccale dello *Scop. caudispinosus* Johs. furono trovati in Genova il 18 Maggio 1908". The figures, referred to, are Pl. VII, Fig. 2, and Pl. XIX, Figs. 2—5; but what is represented there has nothing at all to do with any *Peroderma* whatsoever!

[2])

"Thor"'s St. No.	Lat. N.	Long. W.	Depth of capture	Date
99.	36° 02′	5° 16′	150 Met.	23/6 1910.
59.	36° 12′	4° 21′	9—1200 —	21/2 1909.
61.	35° 52′	5° 35′	300 —	21/2 1909.

fish. All specimens examined had the richly branched system of "frontal" appendages inserted into the bulbus arteriosus, the latter being distended to such degree, that it far surpassed in size the ventricle (cfr. Pl. I, Fig. 27 *b* and *v*). Nevertheless the infested specimens looked quite as healthy and well nourished as those free of the parasite.

The three species of *Peroderma* all possess branched appendages from the front end of the cephalothorax[1]). According to Richiardi's figures of *P. cylindricum* the distance between the second and third pair of swimming feet is very great, and in this interspace are found a pair of peculiar chitinous ridges; no terga of abdominal segments are mentioned or figured. Regarding *P. petersi*, which has not been figured, it is said that 4 pairs of feet are present, following each other at short distances, and that the egg-strings are "spirally directed" (after these statements the species seems to me somewhat doubtful as a member of the genus

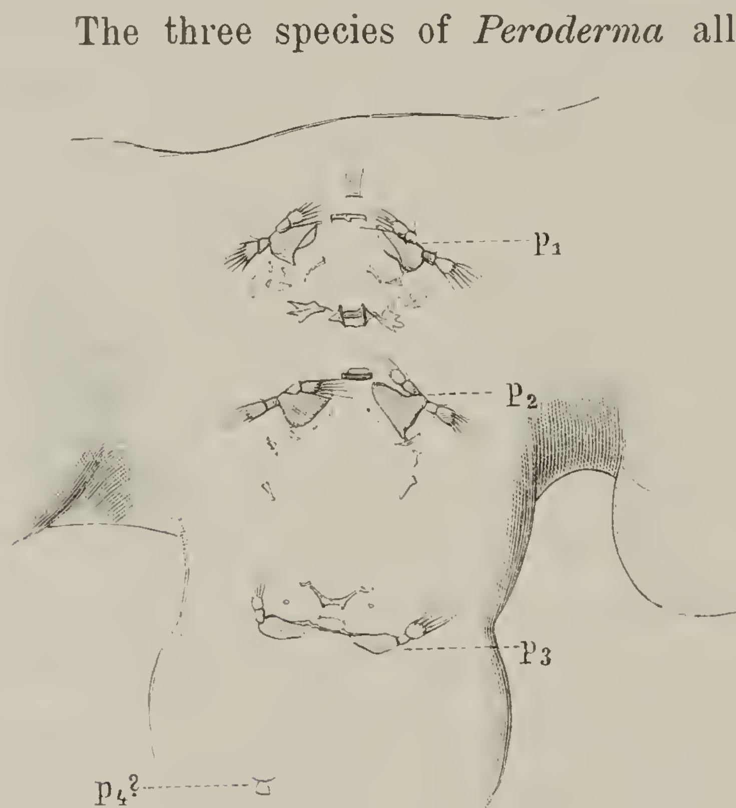


Fig. 1. *Peroderma bellottii.*
Part of ventral side of body, between the two large lateral outgrowths. p_1—p_3: first to third pair of abdominal (thoracic) feet; p_4?: rudimentary structure, perhaps representing the right foot of a fourth pair.

---

[1]) C. B. Wilson has (23, p. 458, Pl. LXXVI, Figs. 99—100) described a "*Lernæenicus medusæus*" taken on *Nannobrachium leucopsarum* at Monterey, Calif., which may belong to the genus *Peroderma*, as it very much resembles *P. bellottii*. But it is said to possess only 2 pairs of swimming feet, with single rami, and the author adds: "No other appendages are visible", and that no sipho is to be seen. These statements seem to me somewhat doubtful. The place on the host is not mentioned.

Peroderma). *P. bellottii*, which I have examined myself, has only 3 pairs of feet developed; but behind the last pair a merely rudimentary structure is seen, which may perhaps represent a fourth pair. The 3 pairs are arranged with large interspaces (cfr. text-figure 1, pag. 12), in which small symmetrically scattered chitinous parcels are found, looking like ventral parts of the segments, burst from each other by the distension of the body during its growth. The feet, compared with those of *Sarcotretes*, are smaller and of a somewhat different shape, and the same may be said regarding the antennæ, first maxillipeds and sipho; further there is a vestigial pair of 2nd maxillipeds (like those of *Lernæa branchialis*) about midway between the first maxillipeds and anterior pair of feet; the dorsal shield of the cephalothorax has quite another shape, being distended and burst into pieces at the margins, probably a consequence of the greater development of the two lateral processes, which are here somewhat asymmetrical and clumsily branched at their outer ends. Only the first of the abdominal terga seems preserved; it is here asymmetrically turned to the left side on a slight swelling immediately behind the large processes. These differences together with the presence of the branched "frontal" appendages seem to me to prevent the inclusion of my *Sarcotretes* in the same genus. Speaking generally, the latter shows more likeness to the genus *Lernæenicus*, f. ex. *L. encrasicholi* (Turton) which I know from my own examination[1]); but, as already stated, this genus possesses four pairs of feet.

2. The stages of metamorphosis (Pl. II, Figs. 11-15, 22-26).

A. The youngest stage which I have found agrees in the main features with the stage of *Lernæa branchialis*, which Claus

[1]) This species has a short median outgrowth from the dorsal side of the cephalothorax about at the level of the two large lateral processes, and furthermore on the ventral side, in front of the maxillipeds a pair of short, clumsy outgrowths. These structures as well as the maxillipeds and maxillæ have been overlooked by A. Scott (19 b, p. 94, Pl. II, Figs. 6—9).

(4, p. 22, Pl. IV, Figs. 1—5) describes as "die erste Cyclopsform" (the "Cyclopid-stage" of Pedaschenko (17, p. 279)) and with the "Cyclopsform" described by Wierzejski (22, p. 571, Pl. XXXII. Fig. 4), found on the gills of Cephalopods and supposed by W. to belong to a species of *Pennella*. I only succeeded in finding 3 specimens of this stage, probably arisen from a Nauplius or Metanauplius (embryonic Naupliæ I did not find in the preserved egg-strings, and consequently I was not able to isolate any). The specimen figured on Pl. II, Fig. 11—12 was found attached to the left side above the pectoral fin of a young *Scop. glacialis*, only 12 mm. in length. The other two were both fixed on a *Scop. gl.*, 25 mm. in length, the one to the left ventral fin, the other to the left pectoral. They were all attached by means of their strong cheliform antennæ. Evidently this stage is capable of active wandering from one spot to another of its host, probably also of swimming along for a while and attaching itself again. This seems to be proved by the whole elegant Cyclops-shape, the proportionally large swimming feet, the antennules etc. The length is between 0,448 and 0,5 mm. Of the specimen figured, ca. 0,5 mm., the elongated ovoid cephalothorax makes up 0,352 mm., the rest 0,112. The rostrum is curved downwards. The antennules are provided with sense-hairs along their front margin and with long setæ distally, at least of half the length of the cephalothorax. The antennæ are strong and projecting, the stout basal segment almost vertically bent against the cephalothorax; of their three segments the basal one is nearly cylindrical and strengthened by chitinous ridges, while the remaining two form a large chela, the longitudinal axis of which is parallel to the cephalothorax. The terminal segment is a long, elegantly awl- or sickle-shaped claw with a curved point, acting against a sharply pointed process on the elongated second segment; the latter carries at some distance another somewhat smaller hook. The sipho is relatively short; laterally it carries the maxilla (*mx*) with its two stout setæ, and just above the root of the maxilla a fairly long, slender appendage ending in a single long seta (*md*); this I

take to be the mandibular palp. One pair of maxillipeds is present, strong, 3-segmented (mp_1); the basal segment has a small denticle on its anterior margin; the terminal segment is a curved, somewhat compressed claw, obliquely striated laterally. The cephalothorax is provided with chitinous thickened lines arranged as in the adult. No eyes are visible. Behind the cephalothorax are 3 distinct abdominal segments and one terminal, representing the postabdomen and bearing on each side of the anus a well developed furcal appendage with setæ (f). There are two pairs of strong swimming-feet, the anterior originating from the ventral margin of the cephalothorax, the second from the first abdominal segment. Each foot consists of a strong basal joint and two rami; each of the latter has only one segment with long setæ, provided with delicate plumules. Each furcal appendage has 4 setæ, the two inner of which, especially the innermost, are long and feathered.

Upon this "actively fixed" stage A, the Cyclops-stage, follows a series of "passively fixed" stages, probably representing as many moultings; they may be called "Pupal stages", as Claus has done in the case of *Lernæa branchialis*, and Wierzejski with the corresponding stages of the Lernaeid, supposed to be a *Pennella*. They are more or less clumsy, with the abdominal feet adpressed and provided — like the antennules — with more or less clumsy setæ or devoid of such, according to the grade of development. The antennæ are relatively short and clumsy chelæ, situated below an elongated rostrum and evidently not fit for grasping. The fixation is brought about by the rostrum; from the end of the latter projects an appendage with a terminal disc firmly cemented to the skin of the host. This appendage is undoubtedly a hardened secretion produced by glands in the front end of the cephalothorax; it is firm like chitine, resisting like the cuticula itself the action of potash; a pear-shaped swelling marks it off from the rostrum proper. I have not been able to see any composition of layers in the swelling, like those observed by Claus in the pupæ of *Lernæa branchialis*, where the number of moultings may be judged directly

from them; in all the present pupal stages I find the structure to be identical.

The total number of pupal specimens found is 34; according to grade of development, size, shape of the setæ etc. they may be grouped into four stages, in the following designated as B, C, D and E. The younger stages are less numerous in my material than the older. All are attached by means of their frontal appendage to *Scopelus glacialis* of 14 to 46 mm. length, mostly to young specimens below 30 mm. Generally each fish has only one pupa attached; but in one case I found two different pupal stages (B and D) fixed on the same host (on the right pectoral fin of a *Sc. gl.* of 28 mm. length), which besides had a young female inserted in front of the dorsal fin; in another case I found one pupa (D) on a *Scopelus* which also carried a young female protruding in front of the dorsal fin. In most cases the pupæ are attached to the fins (in 28 cases of the 34), and especially to one of the ventrals (in 13 out of 28 cases), rarely to the body, and in the latter case mostly to the belly in front of the ventrals; in one single case a pupa was found on the margin of the right opercle. Evidently the pupæ do not prefer the one side of the host to the other, half the number being found on the right, the other half on the left side. Their fixation is always a firm one; to liberate without damaging them it is safe to use a solution of potash. As in the adult and the Cyclops-stage no eyes are seen in the pupal stages, opposite to the case of *Lernœa branchialis* and the supposed *Pennella*-pupæ of Wierzejski.

Stage B. (Textfig. 2 and 3.) The youngest pupal stage I suppose to have been produced through the moulting of the Cyclops-stage A. It is somewhat larger than the latter, measuring from 0,7—0,8 mm. in length; the cephalothorax alone 0,5—0,6 mm. Behind the cephalothorax only two abdominal segments are seen, followed by an unsegmented part, carrying the anus and very short furcal appendages with 4 clumsy indications of setæ. The antennules are clumsy, short, without segmentation, distally provided with

some very short setæ. The antennæ do not reach to the end of the rostrum, their chelæ are weak and unfit for grasping. The sipho is very large; the maxillæ and mandibular palps well developed, the maxillipeds long, their terminal claw clumsy. In some individuals a second (posterior) pair of rudimentary maxillipeds is present; these specimens are males. Chitinous ridges on the

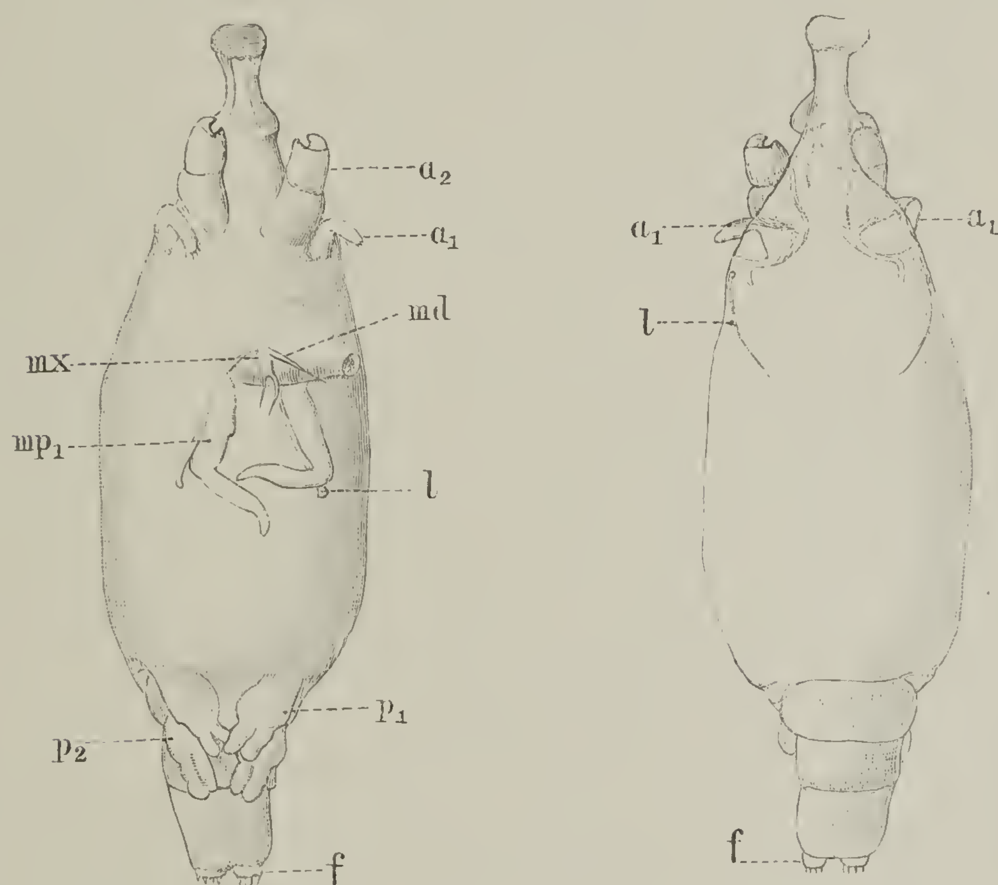


Fig. 2. First pupal stage (B) from ventral and Fig. 3 from dorsal side. a_1 antennule; a_2 antenna; *md* mandibular palp; *mx* maxilla; mp_1 first maxilliped; *l* chitinous thickenings; p_1, p_2 first and second abdominal (thoracic) feet; *f* furcal appendage.

cephalothorax arranged as in the Cyclops-stage and the adult; the same is the case with all the following stages. Two pairs of abdominal feet are present, both biramous and quite without setæ; they are not distinctly segmented but slight incisions mark off a basal portion and two parts of each ramus.

C. (Pl. II, Fig. 13.) The next pupal stage has a length of ca. 1 mm. (the cephalothorax alone being ca. 0,82 mm.). A third abdominal segment is now indicated. The antennules, antennæ etc. are in the main like those of the preceding stage, but a third pair

of abdominal feet is now present as short, flattened appendages to the second abdominal segment; a division into a basal segment and ramus is indistinctly indicated. The distal setæ of the antennules are somewhat larger, and the two biramous feet now show a set of extremely short setæ; the furcal setæ are much as in the stage B.

D. (Pl. II, Figs. 14, 23). The following stage is ca. 1,6 mm. in length (the cephalothorax 1,12 mm.) Antennules, antennæ, maxillipeds and feet are still clumsy; the abdomen has three distinct segments. Third pair of abdominal feet has about half the length of the two anterior pairs; the last abdominal segment is without feet as in the adult. The segmentation of the feet is more marked than in the preceding stage, the basal segment and two segments of the rami being now quite distinct, most so in the anterior pair (cfr. Pl. II, Fig. 23). The same number of setæ as in the adult are present, and the setæ are now much more developed but still clumsy and pressed against each other; the same is the case with those of the antennules. Male specimens show the second pair of maxillipeds (Fig. 14 mp_2) as short, bent appendages about on the level with the "elbow" of the first maxillipeds.

E. (Pl. II, Figs. 15, 24—26.) Stages of ca. 2 mm. length (the cephalothorax ca. 1,36 mm.) seem to be the last pupal stages producing the copulatory form. This may be concluded from the following observations: 1) inside the cuticle of this stage is seen a Copepod-form resembling the adult in many details; 2) a proportionally great number of specimens of this stage has been found, but not a single pupa of larger size or more developed. In this stage the general shape of the body and its appendages are less clumsy than in the preceding; all the setæ are much longer, the segmentation of the feet more pronounced; the postabdomen — including the future genital segment — is now about of the same length as the abdominal segments taken together. The setæ appear more free of each other, and those of the feet show delicate plumules at their extreme, very thinwalled ends (Textfigure 4). Enclosed below the cuticle of this pupa another Copepod-form is seen;

inside the pupal antennæ is distinctly seen a longer and more sickle-shaped claw, quite resembling that of the adult parasite; in the antennules and their setæ the corresponding structures are visible in a more developed form; and in the abdominal feet are very conspicuous distinctly segmented swimming-feet, in every detail agreeing with those of the adult; the long and elegant setæ with their delicate plumules are ensheathed in the shorter and bigger ones of the pupa (cfr. Fig. 24), and in the furcal setæ of the latter the longer ones of the next form show plumules. Any genital openings I have not been able to observe.

In casting off the pupal cuticle this enclosed Copepod probably gives up the fixed condition. As young males and females they leave the empty pupal shells on their former host, swim away and live for a while in a free state, in which they copulate. After copulation the males probably die, while the impregnated females again seek the same species of fish and take up the parasitic life anew, but in a more intense form: they pierce the skin of the fish and, gradually growing, penetrate through the muscles and reach by and by to the intestines of their host. The course of events here set forth, I am sorry to say, is not founded on direct observation; but any reader remembering the facts known from *Lernæa branchialis* will certainly find the above conjecture fairly plausible.



Fig. 4. Last pupal stage (E). Terminal part of setæ of foot, showing extremely delicate plumules.

Directly observed are some early stages of the boring parasite, the structure of which does not deviate very much from that of the Copepod, seen enclosed in the pupa E. As before mentioned they appear externally like small, pale cones of 0,5—2 mm. length, protruding through the skin of *Scop. glacialis*. I have dissected out 3 specimens. The one has a total length of 6 mm.; it projected as a 2 mm. long, slender thread from the back, just in front of the dorsal fin, of a fish of 57 mm. length; it was only inserted

into the muscles and did not reach the vertebral column; the mouth and feet were turned towards the surface of the fish. The other, figured on Pl. II, Figs. 16—18, had an external part of only 1 mm., peeping out of a pit in front of the dorsal fin of a *Scop. glac.* of 25 mm. length. It has pierced the whole musculature and reached between two ribs through the peritoneum, on the inside of which the mouth could be seen; the feet looked towards the vertebral column. The total length is 4 mm.; the cephalothorax is about 1 mm (0,96 mm.), the 3-segmented abdomen 0,240, the remaining ca. 3 mm. are almost entirely made up by the genital segment; the latter is densely striated transversely, and by a very feeble furrow indistinctly marked off from the end segment, carrying the small furcal appendages devoid of setæ. The genital openings are recognizable at the posterior boundary of the genital segment. Except the elongation of the genital segment and the reduction of the rostrum the shape of the animal is that of the stage inside the oldest pupa E. The details of the strengthening ridges of the cephalothorax and antennæ are the same through all stages, also those on the sipho; but the mandibular palp of the larva and pupæ appears now to have vanished.

The third specimen shows a step further towards the final shape (cfr. Pl. II, Figs. 19—21). It projected in front of the dorsal fin of a fish of 25 mm. length; the internal part perforated the muscles, passed close to the vertebral column between two ribs into the abdominal cavity, the mouth lying close to the left side of the small intestine at the origin of the hindmost pyloric appendage. The total length is 6 mm.; the cephalothorax 0,96 mm., the abdomen 0,277 mm., the rest ca. 5 mm. The genital segment is still more elongated, and more swollen posteriorly than in the former, the greatest diameter being 0,320 mm. while that of the cephalothorax is 0,40. Between the genital openings is seen a chitinous spot, probably where the copulatory openings are obliterated. The most marked difference from the two preceding specimens is that the lateral processes of the cephalothorax have appeared in the shape

of thinwalled, wing-like outgrowths ventrally to the margins of the shield; they reach from the level of the maxillipeds to the posterior end of the cephalothorax.

II. The Hydroid.

Seven specimens of the Hydroid have been found; 3 of these consist only of polypes, 4 carry besides sexual individuals. The polypes are all of one kind, functioning at the same time as hydranths and as blastotyles. They originate from a network of anastomosing tubes united by a thin membrane. The membrane and hydrorhizæ are without perisarc as well as the polypes. According to the size of the colony the membrane coats a greater or lesser part of the external portion of the *Sarcotretes scopeli*, described above. As the latter always turns the ventral face, on which the Hydroid is attached, towards the fish, a shelter is provided for the Hydroid. Larger colonies cover the whole ventral face of the parasite and embrace more or less also of its sides, but leave most of the dorsal face free; only round the base of the stalk the membrane may close as a ring. Generally only adult, egg-bearing parasites carry the Hydroid; but in a single case a *Sarcotretes*, which had evidently not yet formed egg-strings, was found provided with a Hydroid-colony (Pl. I, Fig. 6). The youngest Hydroid found had only a single, and still undeveloped polype, in which no mouth was perceptible (Pl. I, Fig. 4); another young colony contains 1 large and 4 smaller polypes (Pl. I, Fig. 5); a third has several polypes and coats most of the ventral face of its Copepod. In two colonies a single or a few polypes bear medusæ-buds; and in the remaining two most of the fully developed polypes carry at their base a number of buds in various stages of development, some of them quite medusiform, showing two tentacles. Most richly provided appears the specimen figured Pl. I, Figs. 1—3; the medusæ are here so numerous and prominent that they are the first to attract attention and determine the aspect of the whole colony.

The polypes are completely devoid of tentacles; their mouth is often expanded into trumpet-shape. When the mouth is expanded the oral entoderm is everted to form the disc or trumpet. Immediately below the disc is seen a narrow, feebly thickened ring, consisting of cylindrical ectoderm-cells somewhat higher than those of the rest of the body. Inside this ring the entodermal circular muscle-fibres are more strongly developed than in the remaining part of the body, these fibres evidently acting as a sphincter. When the mouth is closed, the ring-cells bound the mouth-pore.

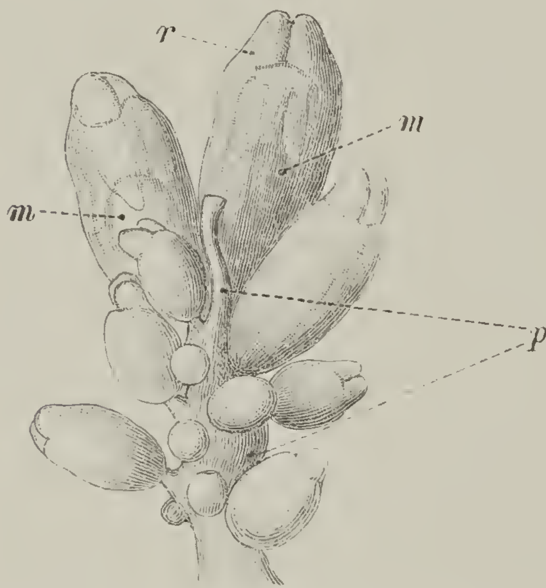


Fig. 5. *Ichthyocodium sarcotretis.* Polype carrying medusæ-buds. *p*: polype; *m*: manubrium of medusa-bud; *r*: marginal tentacle, the greater part of which is bent up inside the bell and indicated as seen through the latter.

The body is cylindrical or claviform, sometimes goblet-shaped; the total length ca. 1—1,5 mm., the diameter from 0,048 to 0,176 mm. In the outer ectoderm of the membrane are numerous fairly large nematocysts, but I have not been able to detect any nematocysts whatever in the ectoderm of the polypes. In the most developed colony (Pl. I, Fig. 1) the largest polypes are found on the ventral side of the parasitic copepod turned towards the fish (therefore not shown in the figure). A proportionally great number of these large polypes (1,5 mm. or somewhat more in length) do not carry any medusæ-buds; but as a few of them bear a single large bud, some others a few small buds at their base, no definite demarcation between sterile and fertile polypes can be drawn, as already stated. Towards the margins of the colony almost all polypes are fertile. The distal part of those polypes which carry a great number of medusæ-buds — up to ca. 20 — is generally very slender and easily overlooked while more or less concealed among their buds (cfr. textfigure 5); but polypes with only a few or only small buds may have quite the same shape as those without any buds at all.

The medusæ-buds are found in all stages and sizes; the largest ones show clearly that they will be set free as real medusæ. Already tiny buds, of 0,160 mm. in diameter, have distinct rudiments of two marginal tentacles; in larger buds these have quite a considerable size but are still clumsy; nevertheless the tentacles are easily overlooked in many of the largest buds, because they have been bent up and concealed inside the umbrella. In the latter case the medusæ-buds appear elongated, fusiform (Pl. I, Fig. 2 *me*) and at first sight do not resemble medusæ at all; in clearing with glycerine or xylol etc. the marginal tentacles and the other medusoid structures are easily observed. There is a short manubrium; no mouth is yet formed, neither are there any indications of mouth-tentacles. In transverse sections the cavity of the manubrium is quadrangular; a narrow canal connects it with the gastric cavity of the mother-polype. The umbrella contains four distinct, wide and simple radial canals, connected distally by a ring-vessel; a velum is indicated as an outgrowth from the ectoderm of the subumbrella.

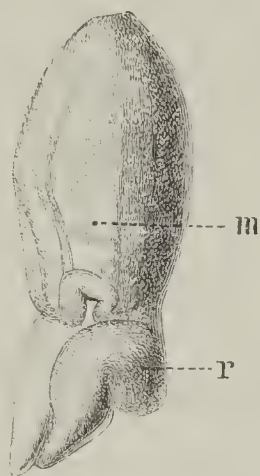


Fig. 6. *Ichthyocodium sarcotretis.* Medusa bud. *m*: manubrium; *r*: marginal tentacle.

The exumbrellar ectoderm contains numerous large nematocysts (ca. 0,004 mm. in diameter), most of them arranged as a broad band across the bell; this band may be distinctly seen already in quite young buds. The tentacles originate opposite the distal ends of two radial canals; they are hollow, their cavity connected with the ring- and radial vessel; no pigmented eye-spot is seen at their base. Between the tentacles the margin of the bell shows a small projecting fold at the ends of the other two radial canals, possibly indications of a new pair of tentacles, developing after the liberation of the medusa. Even in the most developed stage observed the tentacles appear clumsy, finger-shaped, somewhat shorter than the bell (Fig. 3). Sometimes they are bent in the way shown in textfigure 6; in this case they may be mistaken as going to branch into a group of two.

The largest medusæ-buds are fusiform or cylindrical, attached to the mother-polype by a pointed top. One of the largest measures from the point to the margin of the bell 0,40 mm., to the bent angle of the tentacle 0,490 mm., the greatest diameter of the bell being 0,192 mm.; another measures from its top to the distal end of the tentacle 0,62 mm. with a diameter of the bell of 0,232 mm. Genital cells I have not been able to observe; probably they will be found in the manubrium of later stages.

The facts mentioned clearly show that our Hydroid has to be classified with the Gymnoblastic Anthomedusæ. As it does not in every point agree with any other form known to me I propose to name it: *Ichthyocodium sarcotretis.* n. g., n. sp.

Besides *Protohydra*, *Microhydra* and the hydroid stage of *Limnocodium* a few Hydroids are known, the hydranths of which are completely devoid of tentacles. Among undoubtedly gymnoblastic Anthomedusæ I have only found four mentioned; they are all epizoic like our new form, a fact which seems to me of some interest. *Ichthyocodium* shows most likeness to *Hydrichthys mirus* Fewkes. This form was found in 1887 at Newport by Fewkes (7 *a* and *b*), growing on the skin of the fish *Seriola zonata* Cuv. The colony is attached by a thin flat membrane, containing a meshwork of tubes, to the skin of the fish in the neighbourhood of the anus. The membrane is said to be leathery, but without perisarc. From the tubes grow polypes of two kinds: 1) naked gonosomes, like clusters of grapes, consisting of an axial stem the terminal end of which is provided with a mouth-opening, and numerous branches; the latter are of the same structure as the stem, but closed terminally, where they carry clusters of medusæ-buds in various stages, up to medusiform bodies with two clumsy tentacles. The terminal part of the stem does not carry medusæ-buds, is devoid of tentacles, and its margin is entire. 2) Filiform polypes, supposed to be hydranths; they are described as flask-shaped bodies, resembling the palps of *Siphonophores* or the spiral zooids of *Hydractinia* (they are said to move in a similar way to the latter);

they, too, are devoid of tentacles and (probably) possess a mouth-opening, the terminal end sometimes appearing trumpet-shaped. 3) The medusæ. The largest buds are elongated, cylindrical; in the fixed state they do not develop more than two, clumsy tentacles; their surface is speckled with nematocysts (most distinctly seen in the younger stages, still before the medusoid shape is recognizable). When liberated — the fish was kept in an aquarium, and great numbers of medusæ were set free — they at first resemble a young *Stomatoca* (the medusa of *Perigonimus*), having an ovoid, upwards rounded bell, four simple radial canals and ring-vessel, and a proboscis with entire mouth. Later the medusa acquired four tentacles, two new growing out in the interspace of the two first formed. When all four are fully developed it resembles a *Sarsia*. In this stage, possessed of four long and slender tentacles, the medusæ sank to the bottom and died.

If we suppose that the medusæ of *Ichthyocodium*, when set free, also acquire four tentacles — which seems to me at least probable — they would agree with those of *Hydrichthys*; in the attached state, as buds, the likeness is practically complete. The differences of some amount between *Hydrichthys* and *Ichthyocodium* are the following: 1) the basal membrane in the first is firm, leathery; 2) the polypes are of two kinds, sterile and fertile ones; 3) the medusæ-buds are clustered on the ends of branches or stalks from the fertile polypes. According to the figures given by Fewkes (the author does not give any measurements of the polypes, buds or medusæ), the size of the colony in *Hydrichthys* surpasses that of the largest *Ichthyocodium* found; but it is by no means impossible that the latter may acquire a larger size and fuller development than the specimen figured Pl. I, fig. 1.

In 1907 R. E. Lloyd described a *Nudiclava monocanthi* growing on the fish *Monocanthus tomentosus* from the Andamana-Sea (13). Like the preceding this Hydroid is attached by means of a naked basal membrane, containing tubes from which naked, claviform hydranths without tentacles grow (0,75 mm. in length);

on their base they carry gonophores (generally each a single one). Only so far is there a likeness to *Ichthyocodium*; for the gonophores are not set free as medusæ but remain attached as sporosacs, resembling those of *Clava*, and in the same colony are found male as well as female individuals.

In 1909 Miss Winifred E. Coward (6) described *Ptilocodium repens*, epizoic on the Pennatulid *Ptilosarcus sinuosus* (Gray) (captured by the Siboga-Expedition at 9° 03′ Lat. S., 126° 24,5′ Long. E. in 112 Met. depth); it grows along the free edges of the leaves. The colony is dimorphic having two quite distinct forms of polypes arising from tubes enclosed in a basal membrane devoid of perisarc. The hydranths or "gasterozooids" are without tentacles, naked, and possess a simple mouth-pore; they show no nematocysts and reach at most a length of 0,373 mm. More numerous are the "dactylozooids" (ca. 0,186 mm. in length), short and broad polypes bearing at the terminal end four capitate tentacles crowded with large nematocysts; mouth and internal cavity are lacking, the entoderm of the tentacles and body being solid and scalariform. The gonophores arise from the base of the hydranths; they are described as sporosacs but provided with traces of four radial canals and of four rudimentary tentacles on the closed and rudimentary bell, the superficial ectoderm of which shows nematocysts; the closed manubrium bears (female) genital cells. According to the description it seems to me at least possible that these gonophores are not real sporosacs but may carry their development further and eventually be set free as medusæ. But even if this should not be the case, I think *Ptilocodium* has no close relationship to *Ichthyocodium*, the latter showing no dimorphism of the polypes; but *Ptilocodium* apparently is closely allied to the Hydroid, which Kükenthal found growing on another Octactinia. In 1909 Kükenthal described a new Gorgonid from Japan, *Anthoplexaura dimorpha* (11), on which he discovered this epizoic Hydroid (l. c. p. 24); he mentions polypes devoid of tentacles, and others provided with tentacles (sections through one of the latter are figured l. c. Pl. VII, Fig. 37),

and medusoid gonophores (Fig. 38). Later Stechow has examined in detail the same Hydroid (20 a, p. 31, Pl. III, Figs. 7—9); he has given it the name *Hydrichthella epigorgia* and referred it to the family *Corynidæ.* It is quite naked, without perisarc, with an incrusting or cushion-shaped basal coenosarc; stolons are difficult to see; the polypes are of three kinds: hydranths, devoid of tentacles ("Fresspolypen", 0,8—1,3 mm. in length), and two forms of "Wehrpolypen", both without mouth: the one (0,5—0,8 mm. in length) broader, with 4—8 short capitate tentacles in a simple whorl at the upper end; the other (0,53—1 mm. in length) more slender and resembling a long capitate tentacle. The sexual individuals are described as "sporosacs", attached singly by a short stalk to the hydranths; the ova (male specimens have not been found) are enclosed in the wall of a distinct spadix, and the envelope is provided with four distinct radial canals. Apart from the existence of 2 forms of "dactylozooids" the likeness to *Ptilocodium* appears so evident, that a close relationship can not be doubted. All specimens of *Anthoplexaura* from different localities and depths were richly beset with this Hydroid. Stechow, as already mentioned, has referred it to the family *Corynidæ*; and (20 b, No. 142, p. 152) he has also pointed out the close relationship to *Ptilocodium* and argues against the establishing of a new family for the latter. Also *Hydrichthys* is referred by Stechow to the *Corynidæ*; in so far as this will prove to be well founded, our *Ichthyocodium* has to be included in the same family. Thus this family contains the three of the above-mentioned four epizoic Hydroids devoid of tentacles.

It is mentioned above (p. 2) that the triple association of the Hydroid *Ichthyocodium* with the Copepod *Sarcotretes* parasitic on *Scopelus glacialis* is hardly quite an accidental one. I feel most inclined to consider it to be a new case of such regular associations — in some way or other fixed by law — which are known to occur among other Hydroids. That Hydroids in many cases may be found

growing on living animals merely accidentally is well known. I may refer to Alcock (2, p. 207) who has collected a series of examples. From my own experience I might add a case, at first sight parallel to that of *Ichthyocodium*, namely that of *Obelia geniculata*, which I have seen flourishing on a *Lernæa branchialis* attached in the gills of the common cod; a similar case is mentioned by Sæmundsson (21, p. 29). This Hydroid as well as those mentioned by Alcock normally grow on quite other substrata; by accident they may attach themselves to living animals, and they may occur on very different organisms. If, however, a Hydroid is quite regularly met with on the same animal — or a nearly related one — and is only found there, we may be sure that we have before us some kind of symbiosis, in most cases probably a form of commensalism. To decide whether the association involves a reciprocal advantage or is beneficial only to the one part is in most cases very difficult, and a matter of mere conjecture. Alcock also mentions a number of such regular combinations (l. c. p. 208), and he adds as a new case that of *Stylactis (Podocoryne) minoi*, which he always found attached to the skin of the fish *Minous inermis*, while other species of *Minous* apparently were free of this Hydroid. Later the same has been observed at Japan (Franz and Stechow (8), Stechow 20 a; Pl. IV, Fig. 8). That after Heath (9) *Minous inermis* also may be found free of this Hydroid (Snyder is said by H. to have captured several specimens uninfested) in my opinion does not alter in any way the character of *Stylactis minoi* as a symbiotic form; hitherto it has never been found on other substrata than the body of a *Minous*. A somewhat similar association is described by Heath (l. c.): of 37 specimens of the cottoid fish *Hypsagonus quadricornis*, captured in Puget Sound (Friday Harbor), 10 were coated with *Perigonimus pugetensis*, a new species related to *P. vestitus* Allm.

As a "triple-association" between a Hydroid and a Crustacean parasitic on a fish, which perhaps is a regular one, I might mention that of *Eucope parasitica*. This Hydroid is described by Al.

Agassiz (1, p. 87) as found (more than once) on a species of *Pennella* parasitic on *Orthagoriscus mola*; later the same Hydroid was taken by Leidy (12, p. 165) on another Lernean *Lernæonema procera* parasitic on *Odontaspis littoralis*[1]). Hitherto this Hydroid has only been observed growing on Lerneans on fishes; but it is very close to *Eucope polygena*, attached to quite other substrata, and it seems questionable if this case is really different from that of *Obelia geniculata*, mentioned above. At all events the special interest which we at first sight might attach to the examples quoted of associations between Hydroids and Fishes, and still more to those between Hydroids and Lerneans parasitic on Fishes, looses very much when we consider the structure of the Hydroids in question. None of these Hydroids, neither *Stylactis minoi*, nor *Perigonimus pugetensis*, nor *Eucope parasitica* show any peculiar adaptation for their occurring on a living animal, not in the least any more than *Obelia geniculata*, usually found on quite other substrata; in no respect do they carry the stamp of being transformed owing to their peculiar habitation. Whatever the advantage may be for the one part of the association, the Fish or the Lernean, for the Hydroid it will possibly be that of getting an easier access to food supply; but the kind of food and the mode of grasping it I think must be the same as that of their nearest allies not found on living animals.

With *Ichthyocodium*, *Hydrichthys* and *Nudiclava* the case seems to be different. In these Hydroids all the polypes have lost their tentacles; probably because they get their food in another way and take another kind of food than their nearest relatives[2]). I think they depend in some way or other on the fish for food (the Parasitic Copepod in the case of *Ichthyocodium* only serving as attach-

[1]) Whether the "*Campanularia*" which Paul Mayer (15, p. 53) found growing in great numbers on the filaments of a *Pennella (filosa?)* parasitic on *Xiphias gladius* is identical with *Eucope parasitica* Ag. I am unable to decide.

[2]) The absence of nematocysts in the polypes of *Ichthyocodium* seems to point in the same direction.

ment); but how, I am not able to decide. That they as true parasites should feed directly on the tissues of the fish is possible, but seems less probable; neither in *Hydrichthys* nor in *Nudiclava* are the hydrorhizæ sunk into the skin, and the latter appears not to be affected by their presence (the same holds good for the *Scopeli* carrying *Ichthyocodium*); more likely they are messmates or commensals, feeding on leavings from the meals of the fish or perhaps on the excrement of the latter. I may add that I found no contents at all in the gastric cavity of the polypes of *Ichthyocodium* which I have cut in sections.

Explanation of the plates.

List of reference letters.

a = anus.
a_1 = antennule.
a_2 = antenna.
f = furcal appendage.
g = genital segment.
l = chitinous thickening.
m = manubrium of medusa-bud.
md = mandibular palp.
me = medusa-bud.
mp_1 = maxilliped of first pair.
mp_2 = maxilliped of second pair.
mx = maxilla.
o = genital opening.
p = polype.
p_1—p_3 = first to third abdominal (thoracic) foot.
pr = lateral outgrowth from cephalothorax.
r = marginal tentacle of medusa-bud.
si = sipho.

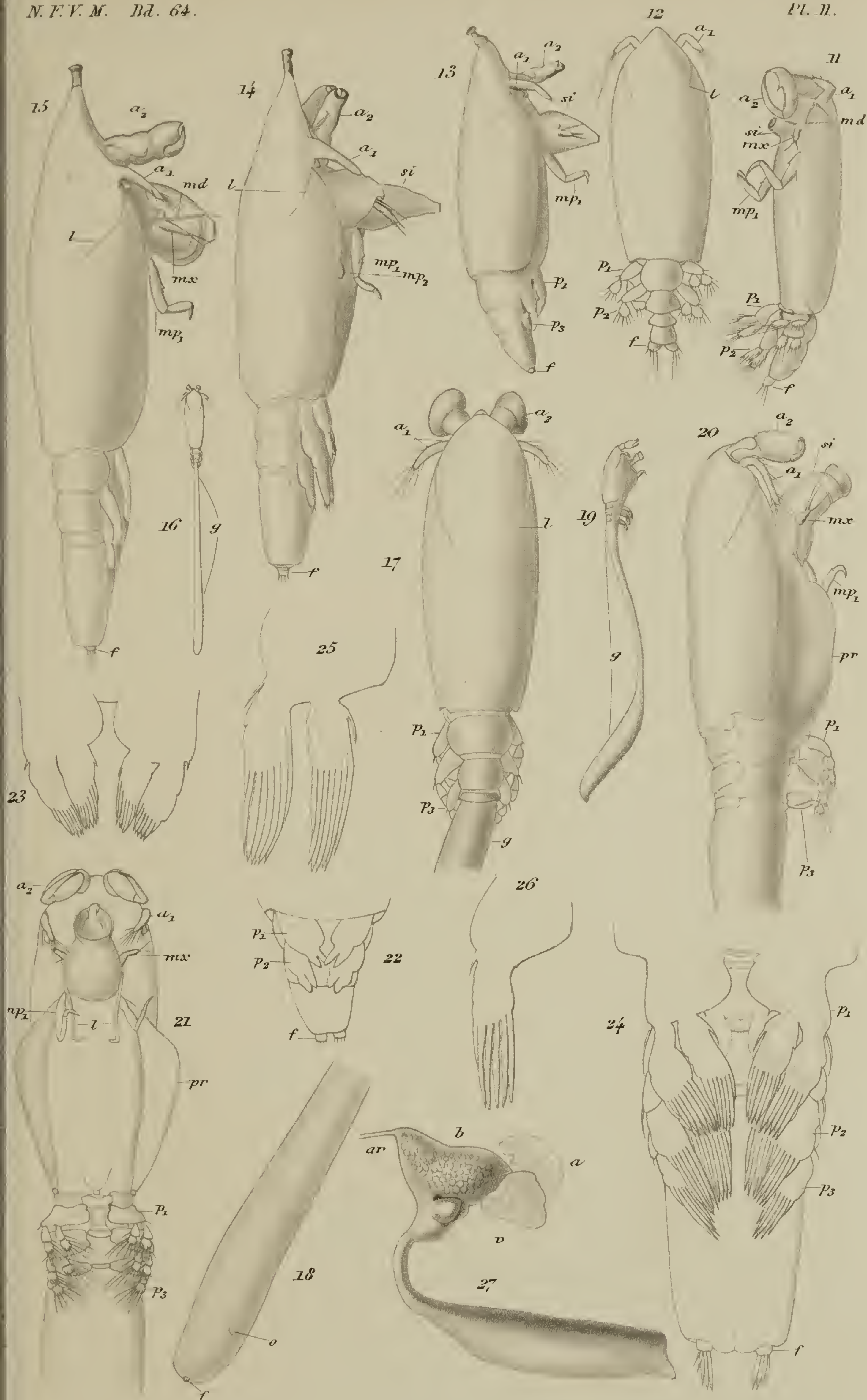
Plate I.

Fig. 1: *Scopelus glacialis* Rhdt. with the combined parasite, composed of the *Sarcotretes scopeli* (without egg-strings) and the *Ichthyocodium sarcotretis.* × c. 2.

— 2: enlarged view of part of the same specimen of *Sarcotretes* (the stalk and proximal part of the swollen external portion) with part of the Hydroid-colony. me_1 = large medusa-bud having lost one of its marginal tentacles.



Aut. & Westergaard del. T. N. Möller sc.



Aut. del. T. N. Möller sc.

Fig. 3: one of the largest medusa-buds. Zeiss Comp. Oc. 4, Apochr. 8.
— 4: base of external part of a *Sarcotretes* carrying a young *Ichthyocodium*, consisting of a single polype, still without mouth-opening ("Thor"'s station 124).
— 5: the same part of another *Sarcotretes* with a young Hydroid-colony of polypes of different sizes ("Thor"'s st. 93).
— 6: posterior portion with the stalk and part of the internal portion of a *Sarcotretes* showing a Hydroid-colony with several polypes (only one carrying a tiny medusa-bud, *me*) and its ramified tubes of the basal membrane ("Thor"'s st. 89). Zeiss Oc. 1, Obj. a* 10.
— 7: adult female *Sarcotretes* with egg-strings ("Thor"'s st. 76). Zeiss Oc. 1, Obj. a* 10.
— 8: anterior part of the same, from dorsal side, but somewhat obliquely ("Thor"'s st. 76). Z. Comp. Oc. 4, Apochr. 16.
— 9: posterior end of the same, ventral aspect. * chitinized spot, probably where the copulatory openings have been. × as Fig. 8.
— 10: anterior part of an adult *Sarcotretes* ♀, ventral aspect („Thor"'s st. 89). Enlargement as in Figs. 8 and 9.

Plate II.

Fig. 11: Cyclops-stage (A) of *Sarcotretes scopeli* from left side ("Thor"'s st. 80). Z. Comp. Oc. 4, Apochr. 8.
— 12; the same, dorsal view.
— 13: second pupal stage (C), from right side. ("Thor"'s st. 177). Z. Comp. Oc. 4, Apochr. 16.
— 14: third pupal stage (D), male specimen ("Thor"'s st. 80). Magnif. as Fig. 13.
— 15: fourth pupal stage (E) ("Thor"'s st. 76). Inside the sipho is seen part of the mouth-funnel of the enclosed copulatory stage.
— 16: young female, ca. 4 mm. long; stage inserted into the body wall of the fish ("Thor"'s st. 76). Z. Oc. 1, Obj. a* 10.
— 17: anterior part of the same specimen, from dorsal side. Z. Comp. Oc. 4, Apochr. 16.
— 18: posterior end of the body of the same, lateral view. Enlarg. as the preceding.
— 19: young female, somewhat older than the preceding, from right side ("Thor"'s st. 76). Oc. 4, Obj. a* 10.
— 20: anterior part of the same. Z. Comp. Oc. 4, Apochr. 16.
— 21: same part, ventral aspect.
— 22: posterior part of first pupal stage (B), from below (stat. 80). Z. Comp. Oc. 4, Apochr. 8.
— 23: first pair of abdominal (thoracic) feet of third pupal stage (D); same specimen as Fig. 14. Z. Comp. Oc. 4, Apochr. 8.
— 24: posterior part of fourth pupal stage (E), ventral aspect (st. 76), same specimen as fig. 15. Inside the left foot of the first pair (p_1) are indicated the outlines of the same foot of the enclosed copulatory stage. Z. Comp. Oc. 4, Apochr. 8.

Fig. 25: right foot of second pair of the same specimen, from below. Enlarged as Figs. 23—24.

— 26: right foot of third pair of the same specimen, from below. As Figs. 23—25.

— 27: *Peroderma bellottii* Rich., ♀ (without egg-strings), inserted into the arterial bulb *b* of the heart of *Scopelus glacialis*; *v* = ventricle; *a* = auricle; *ar* = stem of branchial artery. ("Thor"'s st. 99, 1910). Z. Oc. 1, Obj. a* 10.

The figures 1, 2, 4 and 5 are drawn by H. V. Westergaard, the remaining by the author.

Literature cited.

1. Agassiz, Al.: North American Acalephæ. Ill. Catalogue of the Mus. of Comp. Zoöl. Harvard. 1865.
2. Alcock, A.: Natural History Notes from H. M. Ind. Marine Survey Steamer "Investigator". Ser. II. No. 6. A case of Commensalism between a Gymnoblastic Anthomedusoid (*Stylactis minoi*) and a Scorpænoid Fish (*Minous inermis*). Ann. Mag. Nat. Hist. 7. Ser. Vol. 10. 1892.
3. Brian, A.: Copepodi parasiti dei Pesci d'Italia. 1906.
4. Claus, C.: Beobachtungen über Lernaeocera, Peniculus und Lernaea. Ein Beitrag zur Naturgeschichte der Lernaeen. 1868.
5. Cornalia, E.: Sulla *Taphrobia pilchardi* nuovo genere di Crostacei parasiti. Atti d. Soc. italian. di Sc. Natur. Vol. 18, 2.
6. Coward, Miss W. E.: On Ptilocodium repens, a new gymnoblastic Hydroid epizoic on a Pennatulid. Koninkl. Akad. van Wetenschappen te Amsterdam. Proceedings of the Meet. Febr. 27. 1909.

7a. Fewkes, J. W.: A new mode of life among Medusæ. Proc. Boston Soc. Nat. Hist. Vol. 23. 1888.

» b. — —: On certain medusæ from New England. (No. 7. Studies from the Newport Marine Zoological Laboratory. Comm. by Alex. Agassiz.) Bull. Mus. Comp. Zoöl. Vol. 13 (1887).

8. Franz, V. und Stechow, E.: Symbiose zwischen einem Fische und einem Hydroidpolypen. Zoolog. Anzeiger. Bd. 32. 1908.
9. Heath, H.: The Association of a Fish with a Hydroid. Biol. Bull. Marine Biol. Labor. Woods Hole, Mass.; Vol. 19, No. 2. 1910.
10. Heller. C.: Crustaceen: Reise der Oesterr. Fregatte Novara um die Erde. Zool. Theil. 2. Bd. 1868.
11. Kükenthal, W.: Japanische Gorgoniden. I. Teil. Abhdl. d. m.-phys. Kl. d. K. Bayer. Akad. d. Wissensch. 1. Suppl.-Bd. 5. Abhdl. 1909.
12. Leidy, J.: Parasitic Crustacea (*Lernæocera procera* with attached Hydromedusa *Eucope parasitica*). Proc. Ac. Nat. Sc. Philadelphia. 1888.

13. Lloyd, R. E.: *Nudiclava monocanthi*, the type of a new genus of Hydroids parasitic on Fish. Records of the Indian Museum. Vol. I. Part 4. 1907.
14. Mayer, Paul: Carcinologische Mittheilungen. V. Pennella und Conchoderma (p. 53). Mittheilungen aus der Zool. Station zu Neapel. 1. Bd. 1879.
15. Metzger, A.: Über das Männchen und Weibchen der Gattung Lernaea vor dem Eintritt der sogen. rückschreitenden Metamorphose. Nachr. K. Gesellsch. d. Wissensch. Göttingen. 1868.
16. Mrázek, A.: Über Baculus Lubb. und Hessella Br. Ein Beitrag zur Anatomie der Lernaeiden. Sitzungsber. d. kön. böhm. Gesellsch d. Wissensch. M. N. Cl. 1895.
17. Pedaschenko, D. D.: Die Embryonalentwickelung und Metamorphose von Lernaea branchialis L. Travaux de la Soc. Imp. des Naturalistes de St-Pétersbourg. Vol. 26. Livr. 4. 1898.
18 a. Richiardi, S.: Intorno al Peroderma cylindricum del L'Heller etc. (1875.) Atti della Società Toscana di Sc. natur. resid. in Pisa. Vol. 2. 1876.
„ b. — —: Intorno a due specie nuove di Crostacei parasiti. Atti della Soc. Tosc. etc. Processi verbali. 1881 (also in: Zoologischer Anzeiger. 4. Bd. 1881).
„ c. — —: Intorno ad una nuova specie del genere *Peroderma*. Atti della Soc. Tosc. etc. Processi verbali. Vol. 8. 1882 (also in: Zool. Anz. 5. Bd. 1882).
19 a. Scott, A.: Lepeophtheirus and Lernæa. Liverpool Mar. Biol. Comm Memoir VI. 1901.
„ b. — —: Faunistic Notes. No. 15. Rep. for 1906 on the Lancashire Sea-Fisheries Laboratory etc. 1907.
20 a. Stechow, E.: Hydroidpolypen der japanischen Ostküste. 1. Teil. Beitr. zur Naturg. Ostasiens, herausgeg. von F. Doflein. Abhdl. m. ph. Kl. der Kön. Bayer. Akad. d. Wissensch. 1. Suppl.-Band. 6. Abhdl. 1909.
„ b. — —: Rep. of Miss Winifred E. Cowards paper on Ptilocodium repens. Zool. Centralbl. 17. Bd. 1910. No. 142.
21. Sæmundsson, B.: Bidrag til Kundskaben om de islandske Hydroider. II. Vid. Medd. Naturh. Foren. 1911. Bd. 63.
22. Wierzejski, A.: Über Schmarotzerkrebse von Cephalopoden. 1. Lernæenlarven (Pennella varians Stp. & Ltk.?). Zeitschr. für wissensch. Zoologie. Bd. 29. 1877.
23. Wilson, C. B.: North American Parasitic Copepods: A List of those found upon the Fishes of the Pacific coasts, with descriptions of new genera and species. Pr. U. S. Nat. Mus. Vol. 35. 1909.

18—12—1911.

Om fritbyggede Honningbireder i Danmark.

(On the nidification of honey-bees in the open-air in Denmark.)

af

Dr. phil. ***J. C. Nielsen.***

Honningbireder, der i Lighed med de to tropiske *Apis*-Arter *Apis florea*'s og *A. dorsata*'s Reder er byggede frit, d. v. s. hverken i Kuber eller i hule Træer, men befæstede til Trægrene og saaledes at Vokskagerne er ubeskyttede, forekommer meget sjældent. Fra ældre Tid kendes kun en af Curtis [1]) omtalt og afbildet Rede, som var fundet i England i Aaret 1838; i de senere Aar har Professor E. L. Bouvier [2]) i forskellige Afhandlinger beskrevet fire saadanne Reder, to, der var byggede paa Træer i eller i Omegnen af Jardin des Plantes i Paris, en fra Midtfrankrig og en fra Korsika.

Alle Rederne bestod af flere, 6—8, Vokskager, der var befæstede til Grene og var mere eller mindre regelmæssigt byggede alt efter Underlagets Beskaffenhed.

Ogsaa i Danmark er der i de sidste Aar fundet fritbyggede Honningbireder.

En saadan opdagedes i Oktober 1908 i en Have ved Strandvejen omtrent en halv Mil nord for København og blev af Havens

---

[1]) Curtis: British Entomology IV, 1823—1840, p. 391, Tab. 769.

[2]) E. L. Bouvier: Sur la nidification d'une colonie d'Abeilles à l'air libre (Bulletin de la Société Philomatique de Paris 1905, p. 187). — Nouvelles Observations sur la nidification d'abeilles à l'air libre (Annales de la Société Entomologique de France Vol. LXXV, 1906, p. 429). — Note sur les nids aeriens de l'abeille mellifique (nouveaux faits) (Bulletin de la Société Entomologique de France 1907, p. 294).

Ejer, Grosserer A. S. Goldschmidt, skænket til den kgl. Veterinær- og Landbohøjskoles zoologiske Samling, hvor den nu opbevares.

Reden (Fig. 1, 2), der bestod af fire nogenlunde parallelt byggede Vokskager, var anbragt paa et Hestekastanietræ i temmelig betydelig Højde over Jorden; over den dannede Træets Blade et tæt Dække, og dens mod Nord vendte Side var dækket ved Træets Stamme og Blade, medens dens sydlige Side var mere udsat. Reden var fæstet til Undersiden af en Gren af Diameter c. 4 cm, hvis indre (mod Stammen vendte) Del i Modsætning til den ydre, forgrenede Del kun frembød forholdsvis sparsom Plads til Anbringelse af Vokskagerne. Henimod Grenens Basis, hvor Kagerne var byggede tæt op imod hverandre, indeholdt de Celler med ganske lave Vægge; længere ude derimod, hvor de ogsaa var befæstede til Sidegrenene og hvor Kagerne delvis var sammenbyggede (Fig. 2) var Cellerne endog meget højere end normalt. De fire Vokskager var omtrent af samme Størrelse, nogle og tredive Centimeter brede og nogle og tyve høje. I de to yderste og i en af de inderste havde Bierne boret flere Smaahuller, hvis Diameter var indtil 3 cm. Vokskagerne indeholdt hverken Dronninge- eller Droneceller; nogle ganske faa Celler ved Basis af en af de midterste Vokskager indeholdt Honning; alle de andre var tomme.

Den anden Rede (Fig. 3, 4) fandtes i Begyndelsen af Juli 1911 i Frederiksberg Gymnasiums Skolehave og blev af Skolebestyrer L. Otterstrøm givet til Universitetets zoologiske Museum. Den var anbragt i en Højde af c. 2 Meter over Jorden paa den sydlige Side af et Pæretræ og befæstet til en omkring dettes Stamme voksende Kaprifolium. Den var, da den fandtes, saa stor som en Haand og voksede i Løbet af Sommeren til en Størrelse af c. 38 cm i Højden og c. 26 cm i Bredden; i September, da den fotograferedes, bestod den af 6 Vokskager foruden en lille halvrund Kage, der var bygget over de øvrige Kager, vinkelret paa disse.

Reden hvilede fornemmelig paa et Par tykkere, sammensnoede Grene af Kaprifolien, men støttedes desuden af flere andre Grene, hvoraf nogle helt omsluttedes af Vokskagerne; den nedre Bagrand

af disse var dybt indbugtet omkring nogle større Grene. Vokskagerne var, bortset fra den nysnævnte lille halvrunde Vokskage, parallelt stillede. Af Fig. 3, der viser Reden skraat fra venstre, fremgaar, at de to yderste Kager var sammenbyggede lidt nedenfor Midten; paa samme Maade var den næstyderste Vokskage sammenbygget med den tredie o. s. v. Reden udgjorde som Følge heraf et sluttet og solidt Hele.

Ligesom i den først omtalte Rede fandtes der i denne kun smaa Celler; ganske faa af disse indeholdt Honning.

Som Billederne viser, sad Bierne i Mellemrummene imellem Vokskagerne. Efterhaanden mindskedes deres Antal; i Slutningen af Oktober fandtes der kun Bier i to af Mellemrummene. Den 24. November blev Reden taget ind; den foregaaende Nat havde det frosset, og en Del af Bierne var faldne til Jorden. I de to Mellemrum sad endnu omtrent 150 tilsyneladende livløse Bier, adskillige med Forkroppen stukket ind i de tomme Celler, en Stilling, som ogsaa de to fornævnte Forfattere har set, at Bierne indtog i de af dem undersøgte Reder. Efter at Reden i nogen Tid havde været anbragt i en opvarmet Stue, viste det sig, at de fleste af Bierne dog ikke var døde.

De to beskrevne Reder er ikke de eneste her i Landet fundne Exemplarer af fritbyggede Honningbireder. Docent R. H. Stamm har meddelt mig, at han har været i Besiddelse af en Vokskage, der var funden bygget til Undersiden af en Bøgegren og fæstet til Bladene. Noget nærmere om denne Rede, dens Bygning og Findested kan desværre ikke nu oplyses.

Summary.

This paper deals with the specimens of honey-bee-nests constructed in the open air hitherto found in Denmark.

Figs. 1—2 show a nest, found in a garden ca. 2 miles north of Copenhagen, attached to the underside of a branch of a horse-

chesnut. The nest was composed by 4 honey-combs, whose dimensions were nearly the same, a little more than 30 cm. in breadth and between 20 and 30 cm. in height.

In Figs. 3—4 a nest, found in a garden at Frederiksberg (Copenhagen) is represented; the nest was attached to the branches of a honey-suckle, growing on a pear-tree, and consisted of 5 honey-combs, which were mutually connected. The length of the nest was ca. 38 cm and the breadth ca. 23 cm.

In both nests were found neither drone- nor queen-cells and in both only few cells contained honey.

6—1—1912.

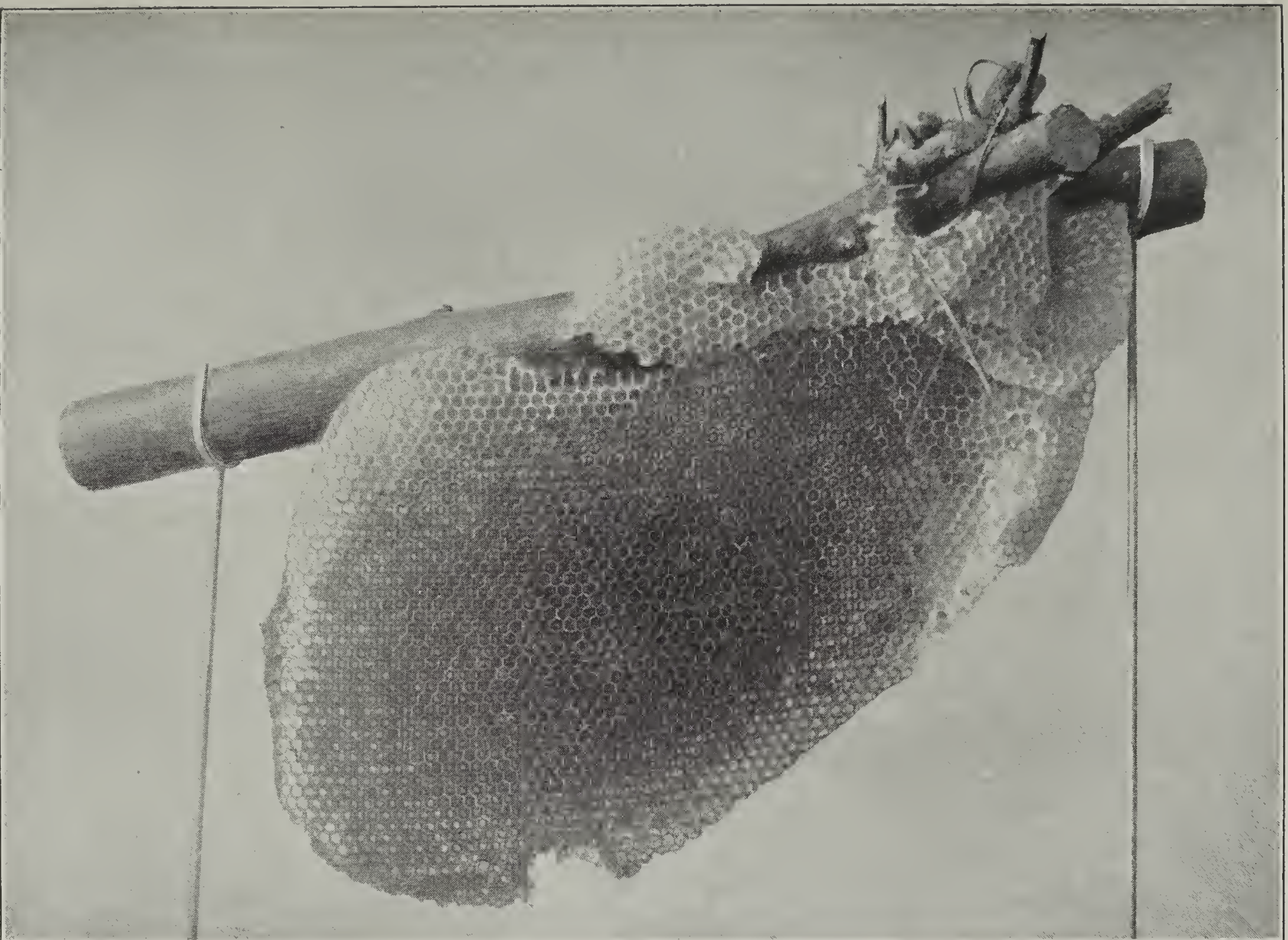


Fig. 1.

Fr. Riise phot.

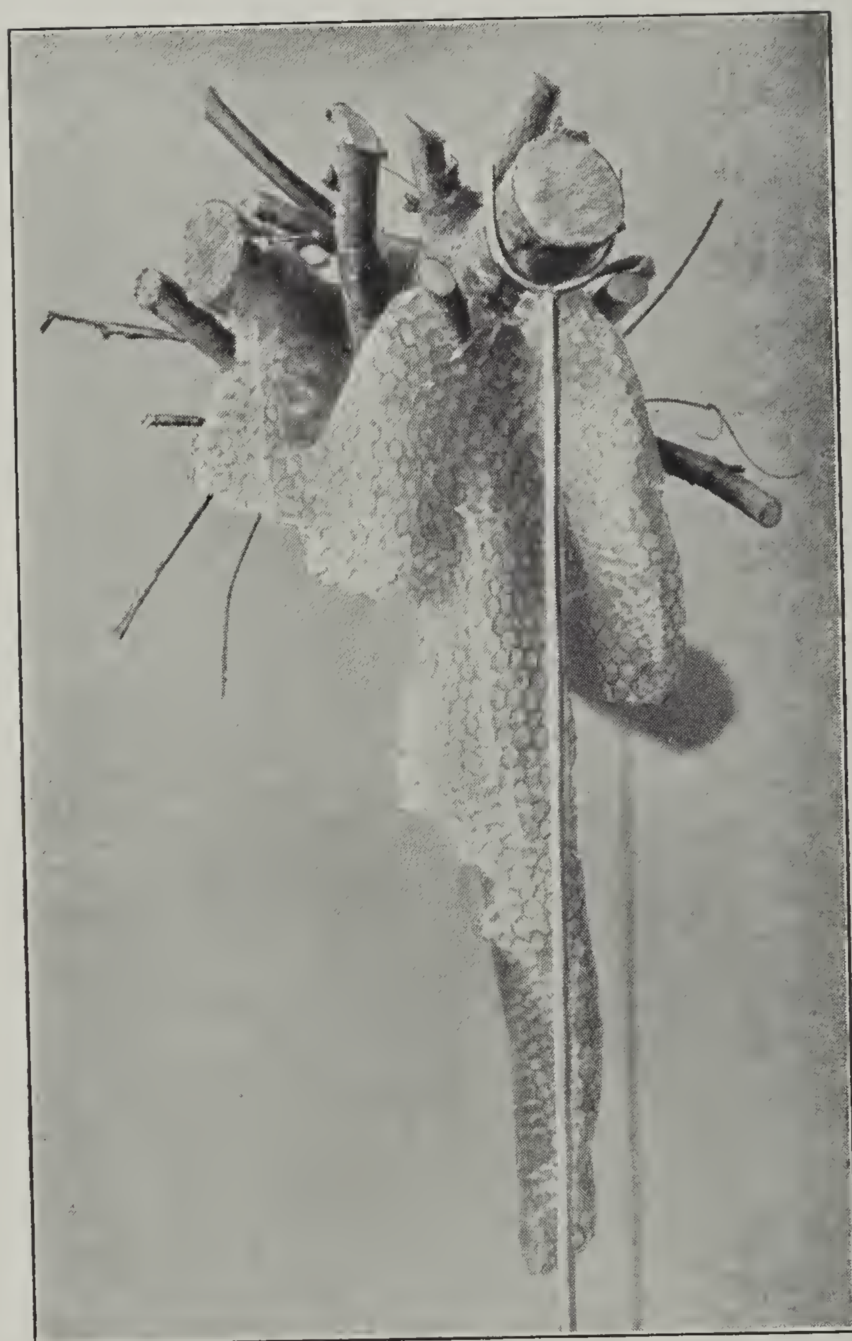


Fig. 2. Fr. Riise phot.

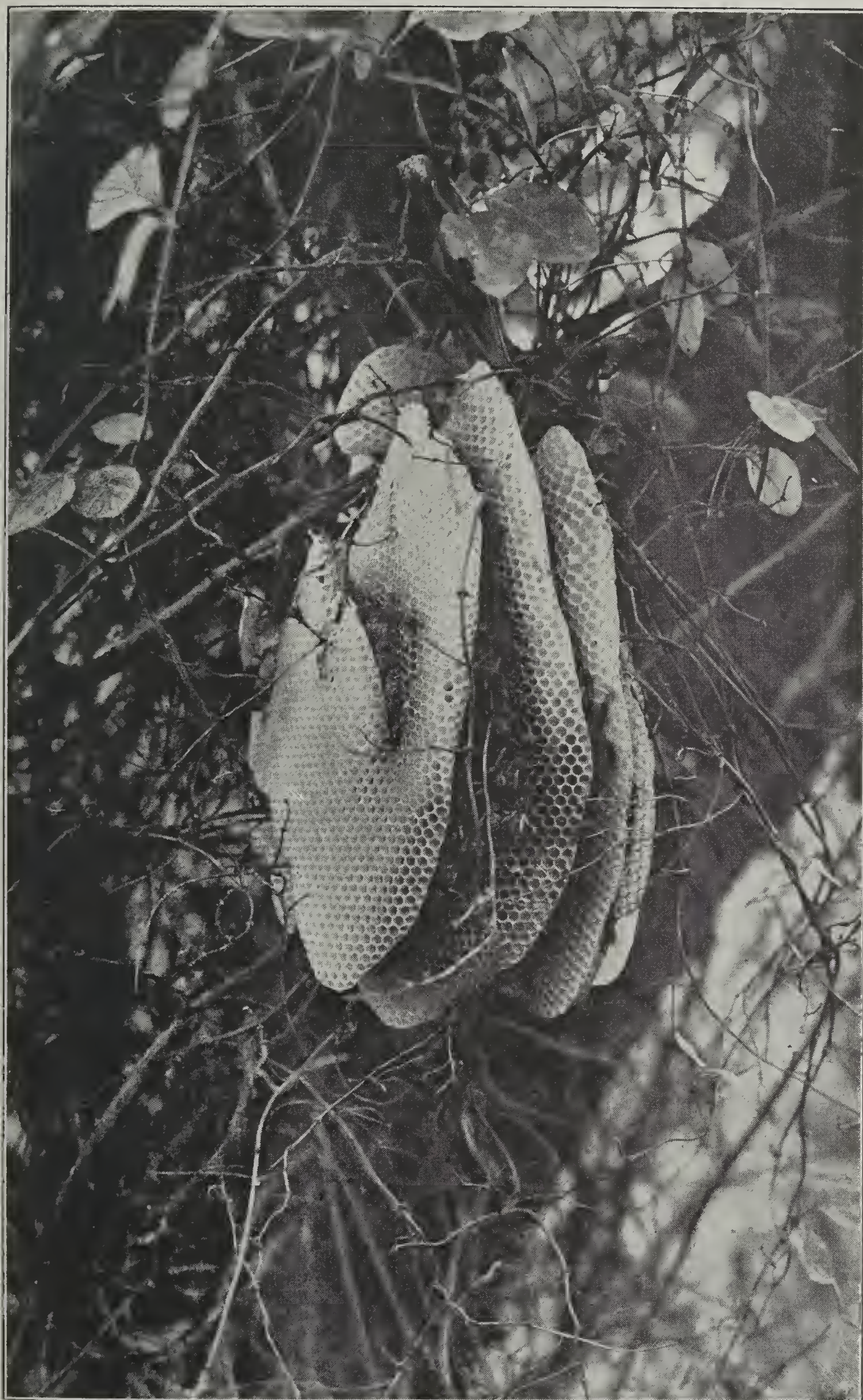


Fig. 3. R. S. Stamm phot.



Fig. 4.

R. H. Stamm phot.

Contributions to the biology of some North Atlantic species of Eels.

By

Dr. ***Johs. Schmidt.***

(With Plate III.)

In an article in "Nature", 2158, 1911, I showed how the common European Conger-eel (*C. vulgaris*) reproduces both in the western and eastern part of the Mediterranean, mainly at or over great depths, the early fry being found in quantities in the surface-water far from the shores. As the Atlantic material collected by the "Thor" and by numerous other Danish vessels in earlier and more recent years has now been worked up, some further information can be given regarding the biology of this fish. From the same parts of the Atlantic we have three other Leptocephali, namely, *Conger* (*Congromuræna*) *mystax*, *C.* (*Congromuræna*) *balearicus* and *Leptocephalus lanceolatus*, and these may also be mentioned here. The common Conger, as is well known, is a fish of great economic importance, the second and third are of no value as food-fishes, whilst the adult of the fourth is as yet unknown; nevertheless, they are all of no little biological interest, and the same is the case with two other forms, *Leptocephalus ingolfianus* and *L. Andreae*, which may be just mentioned here.

The older full-grown larval stages and the transitional stages of the first three species have long been known, though from a few isolated localities only. After Gill, Delage and Grassi and Calandruccio had shown that Leptocephali were the larvae of

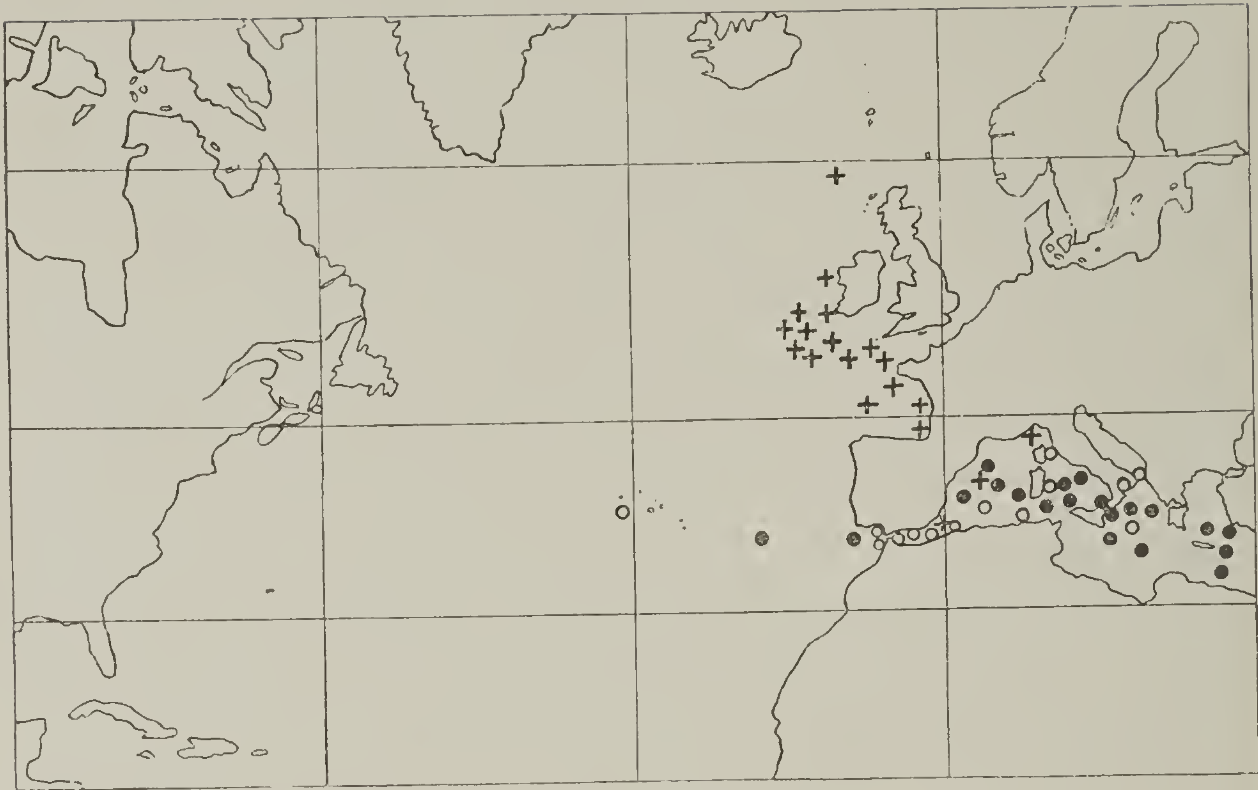
eels, their study became of much greater interest, but it must be confessed, that the older descriptions of the Leptocephali are so imperfect and unsatisfactory, that a certain determination of the species from them is impossible; naturally, any attempt to discuss the distribution of the species on such a basis is still more impossible. It may be said that in addition to a good figure, the main thing required in a careful description is the exact number of myomeres. Grassi and Calandruccio pointed out that the number of myomeres in the Leptocephali corresponds to the number of vertebræ in the parent form. This fact I have frequently confirmed and we thus have a means of referring a Leptocephalus to its parent species as well as of distinguishing between the different Leptocephali, even when in other characters there is apparently no difference.

Though Delage showed that *L. morrisii* is the larva of *Conger vulgaris* and Grassi and Calandruccio, on confirming this, added that several Leptocephali known from the Straits of Messina under various names are the larvae of *C. mystax* and *C. balearicus*, yet, up to the present time, figures and descriptions of these three Leptocephali which would enable us to distinguish them from nearly related forms have not been published. I have found it necessary, therefore, to study the question anew from the very beginning in the only way possible, namely, by counting the vertebræ in the larval and adult forms. In this way I have been able to determine the larval stages occurring inside the territory investigated, which includes the Mediterranean and the North Atlantic north of ca. 20° N. L.

The full-grown larvae of the Conger-species mentioned differ in regard to size. *C. balearicus* has the largest larva (ca. 20 cm.), *C. mystax* the smallest (ca. 13 cm.), whilst the larva of *C. vulgaris* may attain a length of ca. 16 cm. All three species have long ribbon-like bodies with the anus far behind near the beginning of the tail, nearest in *C. balearicus*, furthest away in *C. vulgaris* (see figs. 1—6).

The pigmentation, whose diagnostic importance in the Leptocephali was sufficiently pointed out by the Italian Bellotti (1883), is very characteristic and makes it possible to distinguish the three species occurring in our territory at a glance. They all have pigment along the gut, at the end of the tail and between this and the anus along the base of the anal fin; but from the pigment on the sides alone the species may easily be distinguished. *Conger mystax* does not have this pigment, *C. vulgaris* has a row of rather large round spots and *C. balearicus* has short rows of fine points on the boundaries between the muscular segments. *C. balearicus* besides has large isolated patches on the dorsal margin which are lacking in the other species. The number of myomeres which corresponds to the number of vertebræ in the species in question is also different, in *C. vulgaris* ca. 158, in *C. mystax* ca. 138 and in *C. balearicus* ca. 130.

The ca. 1—2 cm. long larvae of *C. vulgaris* and *C. mystax* have been taken by the "Thor" in quantities in the Mediterranean, but it was only by means of long series of intermediate stages, up to a length when the number of vertebræ could be determined with certainty, that we have been able to identify them. In figs. 2 and 4. these stages of the two species are represented from specimens which were so well preserved that they could be microphotographed. It is easily seen from the figures, that the larva of *C. vulgaris* differs from *C. mystax* by having a shorter snout and a longer tail; further, the pigment patches along the gut are much closer together in the latter than in the former and *C. mystax* also has some pigment spots at the point of the lower jaw which are wanting in *C. vulgaris*. Of *C. balearicus* I have not seen stages smaller than ca. $2^1/_2$ cm. and these are already so characteristic, owing to the pigment on the sides, the dorsal pigment and the position of the anus, that they cannot be confused with other species. A fourth species of Leptocephalus, of unknown parentage, will be described later; meanwhile, I may just briefly discuss the distribution and biological conditions of the above three species, for which both the



Conger vulgaris: ● Early larvae (1—2 cm.).
○ Half-grown larvae.
+ Full-grown larvae.



C. (Congromuræna) mystax: ● Early larvae (1—2 cm.).
○ Half-grown larvae.
+ Full-grown larvae.

Leptocephalus and adult stages are known. The data are noted on the accompanying charts.

1. *Conger vulgaris.* My article in "Nature" dealt in the main with the Mediterranean and did not say anything positive as to the spawning-places of the Conger in the Atlantic except that they lie at great depths not far from the Straits of Gibraltar. A further revison of the material has thrown more light upon this question. In the years 1903—06 the "Thor" made extensive investigations in the North Atlantic between Iceland and Spain and found a considerable number of larvae of *Conger vulgaris*, but they were all quite or almost full-grown and consequently revealed nothing about the spawning-places of the species, their age and the time they had been floating in the sea being unknown.

It was therefore a great advance when we found larvae of only 9 mm. in length in the Mediterranean, enabling us to say that we were at or very close to the spawning-places. Furthermore, we ascertained that Conger larvae in the course of half a year grow ca. 5 cm, which gave us the first definite point of support for the determination of the age of any eel-larvae. By far the greater number of larvae below 2 cm. were found over depths greater than 2500 m., even greater than 3000 m., and, as already mentioned, near the surface. During the first days of July and the last days of August investigations were carried out between the Balearic Isles and Sardinia. The early larvae were found in quantities in August but not in the beginning of July, and during the investigations in December, January and February not a single larva smaller than 5 cm. was obtained in the whole Mediterranean. We may therefore draw the conclusion that *Conger vulgaris* spawns in summer and spring in the Mediterranean, somewhat earlier in the eastern than in the western basin.

Thus the early larvae of the common Conger appeared to be very easy to obtain; they are fairly slow in their movements and are found near the surface or right at the surface where they can be taken with any fine-meshed net slowly towed through the water.

The half-grown larvae of ca. 7 cm. in length also appeared to be easily caught. There can be no doubt therefore that the reason why we did not find the early and half-grown larvae during our extensive investigations in 1903—06 west of the British Islands and France and further to the north, must have been that they do not occur there or, in other words, that the Conger does not spawn in those parts of the Atlantic where the species otherwise is so common. Through the discovery of larvae 1 cm. long we have already obtained an indirect confirmation of this fact and, at the same time, the position of spawning-places of the European Conger in the Atlantic have been found. These larvae were taken during the latter half of July at the surface over depths greater than 3000 m. and even greater than 4000 m., i. e. under quite similar conditions as in the Mediterranean. The discovery of these larvae, the smallest of which, to judge from the growth of artificially hatched Murænoid larvae, may be about three weeks old at the most, enables us now for the first time to outline with certainty spawning-places of a definite eel-species in the Atlantic. According to the available data *C. vulgaris* spawns in the Atlantic between 30° and 40° N. Lat., between Europe and the Azores in places where the depth exceeds 3000 m. In our material there is no indication that it spawns nearer North Europe and the British Islands and we must therefore draw the conclusion that the Conger migrate south and westwards from these regions in order to spawn, in the same way as the fresh-water eel, a fact formerly pointed by me. It is probable that the Conger migrates in order to seek warm and very saline water. I am not able to say at what depth the eggs are spawned. But when the early larvae are found at the surface over depths of more than 4000 m., it seems much more probable that the Conger spawns pelagically than at the bottom.

The occurrence of Conger larvae in the Atlantic seems to agree very well with what we know from the Mediterranean, thus the 1—2 cm. long stages are found in the summer, the half-grown

in the winter, so that the life-cycle is as follows: the *Conger vulgaris* spawns in spring and summer in regions where the depths are very great and the water warm and salt (above 36,00 ‰). During winter the larvae reach half their full size and in the following spring and summer the metamorphosis takes place; thus, they live pelagically for 1 to 2 years. The very long duration of the pelagic life accounts for the fact that the larvae of the Conger, like those of the fresh-water eel, are able to spread over such wide regions.

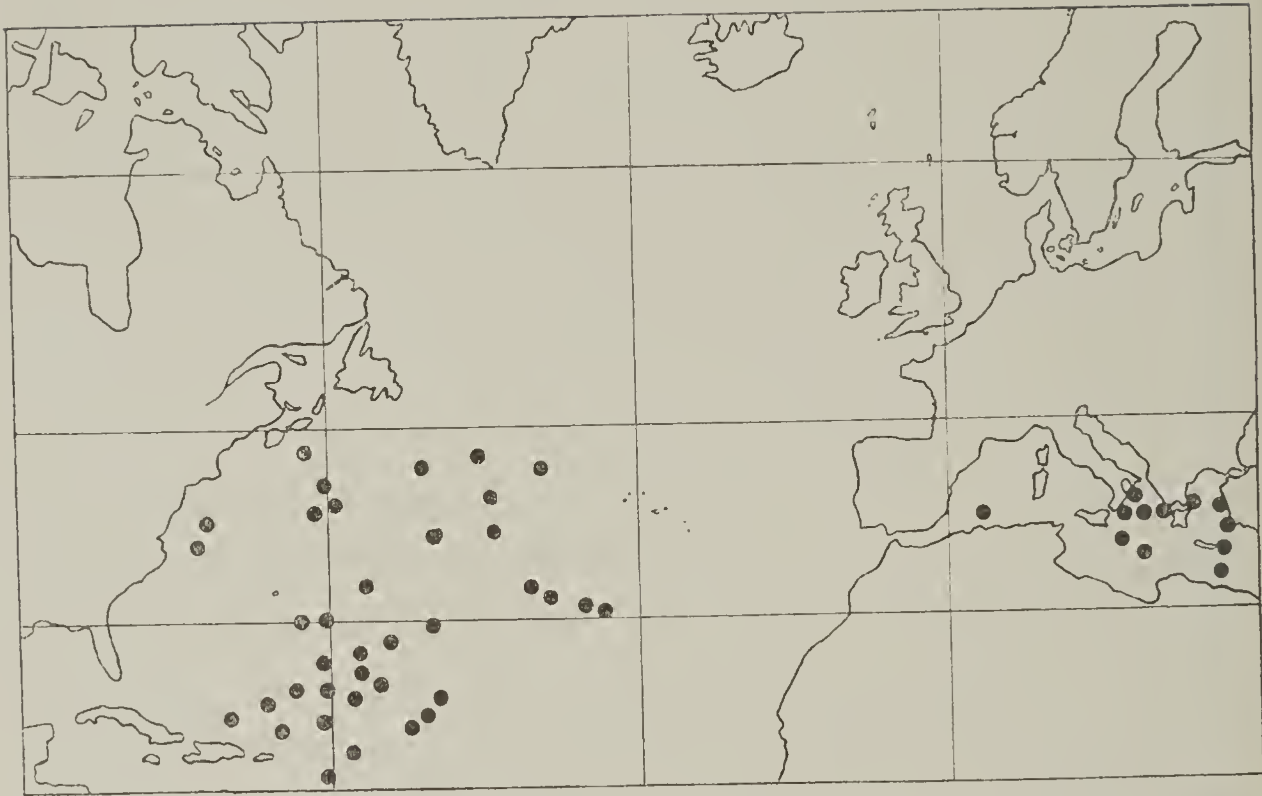
Besides from the Atlantic and the Mediterranean I have seen larvae of the same type as those of the common Conger from the Inland Sea of Japan.

2. *C.* (*Congromuræna*) *mystax*. This species belongs to the Mediterranean, where however its larvae were formerly only known from the Messina Straits. Our investigations have shown that they occur everywhere in the Mediterranean, but outside this sea only a few specimens have been found in the Atlantic not far from Gibraltar. The occurrence of the larvae shows that it spawns later in the year than *Conger vulgaris*, i. e. later in summer and autumn, at which times of the year the smallest stages are found, and it is possible that this species spawns a little nearer the coasts than *Conger vulgaris*.

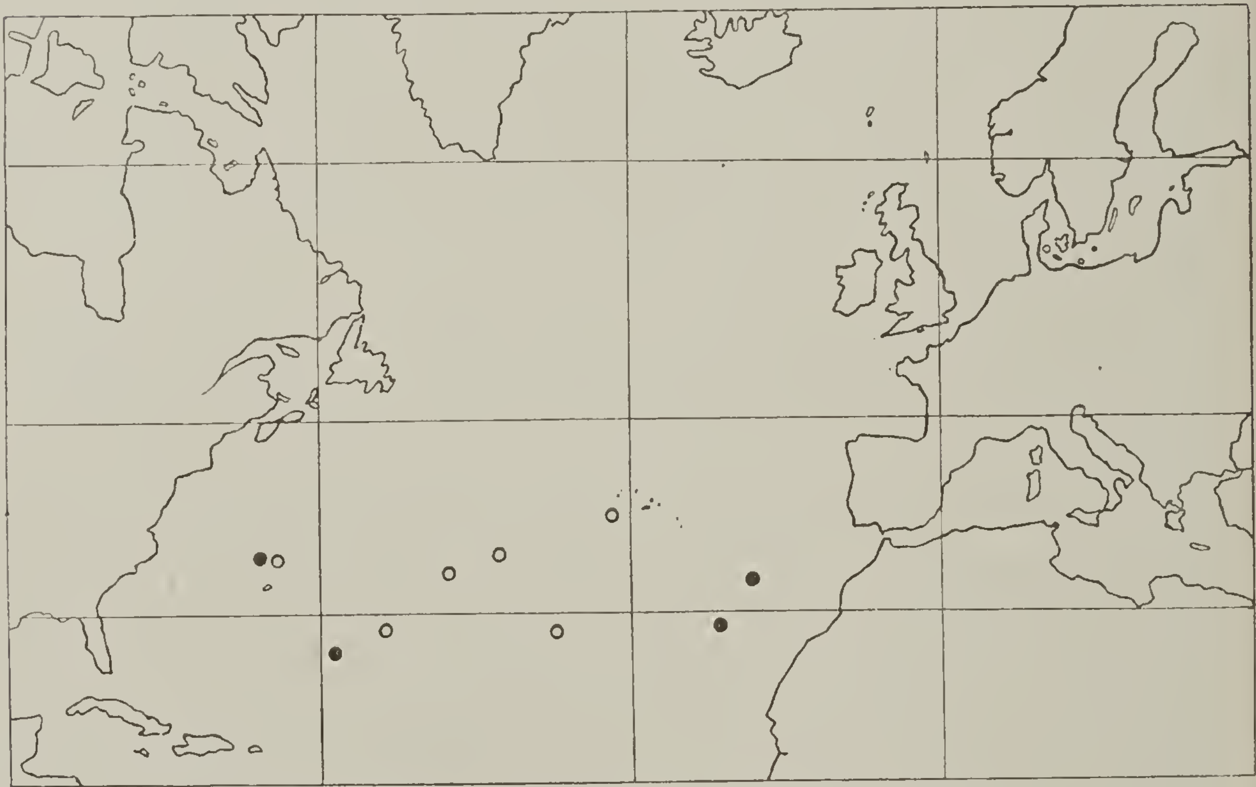
Strömman mentions a form from the South Atlantic (35° 40′ S., 18° 45′ E.), which seems to be very closely related to *C. mystax*.

3. *C.* (*Congromuræna*) *balearicus*. We have two fairly modern descriptions of eel-larvae, by Strömman (1896), and by Eigenmann and Kennedy (1902)[1]. But only the latter is of any use for a certain identification of the species. Strömman does not give the number of vertebræ, so that none of his species

[1] I have described a Leptocephalus from the Atlantic under the name of *L. latus* (Medd. Komm. Havunders., Ser. Fiskeri, Bind III, Nr. 6, 1909), but had overlooked the fact that this name was already occupied. I now propose the name *L. latissimus*.



C. (*Congromuræna*) *balearicus*: ● Larvae.
(The specimens from the Atlantic = *Leptocephalus Eckmani* Strömman emend.)



Leptocephalus lanceolatus Strömman emend.
● Early larvae (1—2 cm.).
○ Older larvae (2—6 cm.).

can be determined with certainty, but through the kindness of the authorities at the Zoological Museum of Upsala I have been able to examine his type specimens; in this way it has been possible to determine their characters and thus to avoid making new names. On counting the vertebræ I found that his *Leptocephalus Eckmani* is identical with a species occurring in immense quantities in our gatherings, especially in the Atlantic west of the Azores. In the Mediterranean a very similar form was described many years ago under the names of *Leptocephalus diaphanus* and *Leptocephalus inornatus*. To determine whether the two forms from the Atlantic and the Mediterranean had anything to do with each other, however, necessitated a comparison of numerous specimens, including counting of vertebræ. It then appeared that the two forms are very closely related, so closely that it is doubtful whether they can be always distinguished when the place of occurrence is unknown. The number o vertebræ is not absolutely different, as the same number may be found in specimens from the Atlantic and Mediterranean, but on an average the number of vertebræ in the form from the Atlantic is 2—3 more than in the form from the Mediterranean. Further, the head of the latter is a little stouter and the rows of pigment spots between the myomeres are a little more marked, containing a few more spots. The Atlantic form is, numerically, by far the most important of all eel-larvae in our collections, showing that it must have a very wide distribution. It has been taken off the continental slope of the western part of the Atlantic from Newfoundland to Guiana and eastwards it ranges to near the Azores. It occurs in largest quantities between 50° and 70° W. Long., taken at the surface over the greatest oceanic depths. H. M. S. "Ingolf" which has made collections for us, took no fewer than 477 specimens in

---

[1]) I imagine that the *Congromuræna flava*, Goode & Bean (Deep-Sea Fishes of the Atlantic Basin, p. 138, 1895) is the parent species of our Atlantic Leptocephalus specimens of *C. balearicus*, but the description of the two American naturalists is not sufficient to permit an identification.

a single haul of 1/2 an hour with a net of 1 1/2 m in diam., near 60° W. and 25° N. According to our present investigations it occurs between 15° and 43° N. and between 32° and ca. 75° W. but it has not yet been taken east of 30° W. Long. In the Mediterranean we find a very closely related but not quite identical form; of this the greatest number of larvae were taken in the eastern basin (east of Italy). On the other hand, we have larvae from the eastern part of the Gulf of Mexico, which differ from the central Atlantic larvae by a lower average number of vertebræ. Thus, in the North Atlantic region we have 3 forms of *C. balearicus*, whose larvae can be distinguished by a small average difference in the number of vertebræ. The larvae living in the Western and central parts of the West Atlantic have the highest number of vertebræ, whilst in the larvae from the European and American Mediterranean (Gulf of Mexico) the average is a little lower. Furthermore, we have specimens from the Southern Atlantic and the Indian Ocean in the older Danish collections, and in the collections of the "Albatross" from the Philippines I have seen quantities of related Leptocephali. *Conger balearicus*-like forms must therefore be very widespread in the warmer parts of the oceans.

As our material does not contain smaller larvae of this species than 2 1/2 cm., it is impossible to determine the position of its spawning-places in the Atlantic and even though the various sizes of the larvae at different places over the vast region of occurrence seem to indicate, that the spawning of the species is restricted to certain parts, I prefer to postpone discussion of this question until we have obtained more definite data.

Lastly, I may just briefly refer to a fourth species of Leptocephalus, which is represented in our collections by a large and valuable material. In old samples dating from Capt. Andréa's time, a Danish Captain who made pelagic collections for the Zoological Museum in Copenhagen between ca. 1860 and 1880, as also in collections made during recent years for "Kommissionen for Hav-

undersøgelser" by various Danish ships, there occurs a characteristic, small Leptocephalus which at first glance resembles *L. brevirostris*. The resemblance is however quite superficial and there can be no question of relation. Fig. 7 shows the external appearance; it will be seen that the tail is pointed and the snout much longer than in *L. brevirostris*. Furthermore, the myomeres have quite a different shape and there is pigment on the tail. An examination of Strömman's type specimens of Leptocephali has convinced me that it must be identical with his *L. lanceolatus*, though this cannot be recognized from his description. The present species has ca. 160 myomeres of which ca. 88 are preanal and my specimens vary in length from ca. 1 to ca. 6 cm. Strömman's largest specimen was 33 mm. and not full-grown. The distribution is seen from the chart (p. 44); it has been found west of 30° W. Long., like *C. balearicus*, but also in the deep, eastern part of the Atlantic near 30° N. L. A point of special interest is the discovery of larvae 1 cm. long in the central, deepest parts of the Atlantic. These show that the species must spawn out here, as larvae of 1 cm. in length cannot have drifted very far from the spawning-places[1]). Further, the discovery of such early larvae at the surface

[1]) The same is the case with a species of *Nettastoma* from the Atlantic and with a species for which I propose the name *Leptocephalus ingolfianus*. As may be seen from the figure 8 it resembles *C. mystax* in shape, but is somewhat higher, and is easily distinguished from this in lacking the pigment row along the gut. (In *L. ingolfianus* pigment is only present near and at the end of the tail.) The number of vertebræ is also different exceeding 150 in *L. ingolfianus*. (In one specimen 79 mm. long I found 118 + 35 = 153 and in a smaller 120 + 35 = 155.) The present specimens measure from ca. 1 to ca. 8 cm. in length and have been found in the Atlantic SW of the Azores, at the surface over a depth of more than 3000 m. (32° 03′ N., 39° 00′ W).

I am unable to say whether another species whose larvae occur in our collections (see fig. 9) and which is related to Strömman's *L. tiluroides*, also propagates in the deep parts of the Atlantic like the parents of *L. lanceolatus* and *ingolfianus*, as we have not obtained specimens less than ca. 7 cm. in length. Is has about 250 preanal vertebræ and is further characterised by the presence of ca. 4 large

over great depths of the ocean, seems to exclude the possibility that the species spawns on the bottom, 6000 m. below the surface where the larvae were found.

The four species mentioned with *Anguilla vulgaris*, *Anguilla rostrata* and *Synaphobranchus pinnatus* compose the greater part of our material from the North Atlantic region. Postponing meanwhile an account of the biology and distribution of the last 3 species I may sum up our results regarding the distribution of the other four. According to the foregoing *C. balearicus* belongs apparently to the western region (west of 30° W. Long.), though a form very closely related to it occurs in the Mediterranean. In regard to the others, *C. mystax* is apparently restricted to the Mediterranean and adjacent parts of the Atlantic and our investigations with the "Thor" show that it spawns in the Mediterranean in summer and autumn. *C. vulgaris* propagates both in the Mediterranean and in the eastern part of the Atlantic between 30° and 40° N. Lat. but not off the shores of the British Isles or France, nor further to the north or east; we may thus conclude that the Conger living here, like the fresh-water eel, migrate south- and westwards in order to spawn in warmer and salter water than they live in during their years of growth. All the information obtained from our present investigations show that *Conger vulgaris* has a rather restricted spawning-time in spring and summer.

L. lanceolatus occurs both in the western, central and eastern parts of the Atlantic between ca. 25° and ca. 35° N. L., where it is born in the central, deep parts of the ocean — a fact which also applies to *L. ingolfianus* and most likely to many other murænoid species.

On the other hand my investigations in the Mediterranean have shown that the dogma put forward by Grassi that all Murænoids spawn in deep water (at least 500 m.) cannot be maintained. As

---

and distant pigment patches sublaterally in the front part of the body. For this form I propose the name *L. Andreæ* in honour of the late Danish captain who collected such a valuable material of Leptocephali.



Pacht & Crone et C. U. Maaløe (Fig. 2 & 4) ad naturam phot.

Fig. 1—2, *Conger vulgaris.* — Fig. 3—4, *Conger (Congromuraena) mystax.* — Fig. 5, *Conger (Congromuraena) balearicus* aff. = *Leptocephalus Eckmani*, Strömman, emend. — Fig. 6, *Conger (Congromuraena) balearicus.* — Fig. 7, *Leptocephalus lanceolatus*, Strömman, emend. — Fig. 8, *Leptocephalus ingolfianus*, n. sp. — Fig. 9, *Leptocephalus Andreae*, n. sp.

far as the investigations go we may divide the murænoid species into two groups: 1) those spawning in or rather over great depths and 2) those spawning in shallow water. To the former belong *Conger vulgaris*, *C. mystax* and probably also the fresh-water eel (further the parent forms of *L. lanceolatus* and *ingolfianus*), to the latter *Muræna helena*, *Ophichthys serpens* and other *Ophichthys*-species, the eggs of which I have been able to identify. The latter spawn in shallow water, inside the 200 or even the 100 m. line where their eggs and tiny larvae occur at the surface together with larvae of true coastal forms.

January 1912.

Explanation of Pl. III.

Fig. 1. *Conger vulgaris*, length: 125 mm; Stat. **106**, $^{25}/_{6}$ 1910, 36° 33′ N., 2° 00′ W., 65 meters wire out.
— 2. *Conger vulgaris*, length: 14 mm; Stat. **144**, $^{23}/_{7}$ 1910, 34° 31′ N., 18° 40′ E., 25 meters wire out.
— 3. *C. (Congromuræna mystax)*, length: 128 mm; Stat. **204**, $^{27}/_{8}$ 1910, 38° 52′ N., 7° 43′ E., 65 meters wire out.
— 4. *C. (Congromuræna mystax)*, length: 15 mm; Stat. **10**, $^{15}/_{12}$ 1908, 37° 21′ N., 16° 45′ E., 25 meters wire out.
— 5. *C. (Congromuræna) balearicus* aff. = *Leptocephalus Eckmani* Strömman, emend., length: 95 mm; Stat. **329**, $^{20}/_{7}$ 1911, 25° 32′ N., 52° 08′ W., 35 meters wire out.
— 6. *C. (Congromuræna) balearicus*, length: 89 mm; Stat. **13**, $^{19}/_{12}$ 1908, 39° 45′ N., 17° 30′ E., 65 meters wire out.
— 7. *Leptocephalus lanceolatus* Strömman, emend., length: 54 mm.; Stat. **263**, $^{16}/_{3}$ 1911, 36° 42′ N., 30° 36′ W., 47 meters wire out.
— 8. *Leptocephalus ingolfianus* Johs. Schmidt, n. sp., length: 79 mm.; Stat. **310**, $^{23}/_{7}$ 1911, 32° 03′ N., 39° 00′ W, 17 meters wire out.
— 9. *Leptocephalus Andreae* Johs. Schmidt, n. sp., length: 101 mm.; Stat. **331**, $^{25}/_{7}$ 1911, 35° 50′ N., 29° 53′ W., 35 meters wire out.

All the figures are reproductions from photographs of specimens preserved in formaline. Figs. 2 and 4 are microphotographs (× 11) by Dr. C. U. Maaløe, Copenhagen, the remaining figures photographs (× $1^{1}/_{3}$) by Pacht & Crone, Copenhagen.

The larval form of *Chlopsis bicolor* Raf.

By

Dr. ***Johs. Schmidt.***

Through Grassi and Calandruccio's work, later continued by Grassi, the larval forms of a series of Mediterranean eel-fishes have become known. In some cases, certainly, the detailed proof is wanting, but we have at any rate become acquainted with most of the generic types of larvae through the investigations of the Italian authors, and we may hope, according to Grassi's statement in his latest paper of 1910, that the, so far, preliminary notices will be followed by the long-expected, detailed proof.

The genera of Mediterranean eel-fishes still unknown in their larval stages are *Chlopsis* and *Todarus*; regarding the genus *Myrus*, Grassi and Calandruccio certainly state, that they have found the larva, but they give no evidence or description. This may also be expected in the complete work.

I propose to deal here with the larva of *Chlopsis*, which is not mentioned by Grassi and Calandruccio, but which has been taken during my investigations with the "Thor" in the Mediterranean. As might be expected, it belongs to quite a different type from the Mediterranean Leptocephali hitherto known, whilst, on the other hand, larvae of the same type have also been found in the Atlantic.

To describe the form is hardly necessary, as reference can be made to the figure. At first glance the larva somewhat resembles *Leptocephalus brevirostris*, but when we examine a little further into details, we see at once, that the two forms have nothing to

do with one another. I need not describe all details, but merely point out the advanced position of the anus in all my specimens; these vary from 3 cm. to a little over 6 cm. in length, and none of them are as yet in process of transformation. Among the Mediterranean Leptocephali a similar position of the anus is only known in the genera *Saurenchelys* and *Nettastoma.* The larva of *Chlopsis* is further remarkable to a special degree for its pigmentation. It possesses a similar row of mediolateral points to the larva of *Conger vulgaris,* but these are considerably smaller and closer together than in the latter. As can be seen from the figure, there is also a row of closely placed points along the upper part of the gut. Further, a row of very fine points is present along the posterior part of the anal fin.

The evidence that the larval form figured here belongs to *Chlopsis bicolor* Raf. is contained first of all in the number of myomeres, which in 14 specimens were found to vary between 131 and 136, ca. 48 being preanal. This number excludes almost all the eel-fishes known from the Mediterranean: *Anguilla, Conger, Congromuraena mystax, Muraena helena, Myrus, Nettastoma, Saurenchelys, Ophichthys serpens, imberbis, hispanus* and sp., in all of which I have counted the vertebrae myself. There remain *Muraena unicolor, Todarus brevirostris, Ophichthys coecus, Congromuraena balearica* and *Chlopsis bicolor.* Of these *Congromuraena balearica* (with *C. mystax*) is at once excluded owing to the fact, that my material of this species contains all transitional stages between metamorphosed, easily determinable specimens and the early larvae (see fig. 2 in my paper of 1912), which are totally different from the larva in question here. With regard to *Ophichthys coecus,* though the number of vertebrae is unknown to me, yet this species may be excluded owing to the fact, that the present larva belongs to quite a different type from the other *Ophichthys* larvae and has rays in all the unpaired fins. *Todarus brevirostris* I only know from Facciola's and Supino's descriptions and figures, from which its appears, that it has a much higher number of vertebrae

than the present larva. There now remain *Muraena unicolor* and *Chlopsis bicolor* of the eel-fishes known in the Mediterranean. According to Grassi the former has 136—140 vertebrae, whilst the latter according to Supino has 133.

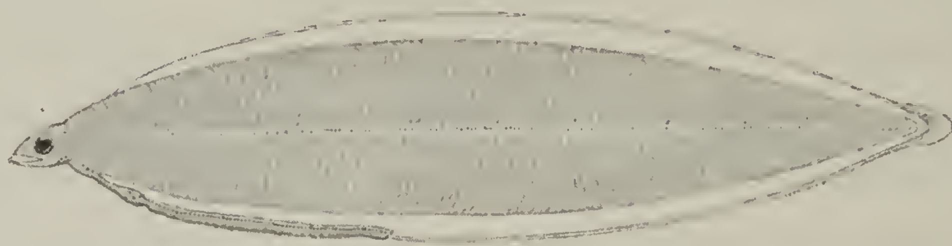
This shows already, that our larva belongs to *Chlopsis* and the position of the anus so far forward also indicates this. This position is found in *Chlopsis*, whereas in *Muraena unicolor* the anus is placed further back, and we have no cases among Leptocephali of the anus moving backwards during metamorphosis. The position of the nostrils also corresponds to the condition in *Chlopsis*, as also the tubular, anterior nostril, a feature that can be quite well detected in the oldest of my larval specimens. Lastly, the structure of the tail in the larva agrees with that in *Chlopsis*. Both the last and second-last hypural elements are broad plates the last bearing 5 or 4 and the second-last 3 or 4 rays.

Among all the characters I have examined, none stands in the way of referring the larva to *Chlopsis*; on the contrary, they all show agreement. The fact that the larva has large pectoral fins (without rays), whilst such are wanting in *Chlopsis*, is not different to what we find in the larvae of other eel-fishes without pectorals, for example *Nettastoma melanurum*.

According to our investigations with the "Thor", *Chlopsis* occurs in all basins of the Mediterranean and it must be one of the commonest species. (It seems to belong to the Muraenoids which spawn in summer and autumn). It is remarkable, therefore, that the larva has not been found at Messina by the Italian naturalists, who have made such rich collections of Leptocephali there; but it does not occur either in the collections of Leptocephali from Messina, which I have at my disposal.

To the same type as the larva of *Chlopsis bicolor* belongs *Leptocephalus hyoproroides*, described by Strömman from the western part of the Atlantic, of which I have had the opportunity to examine the original specimen through the kindness of the

Director of the Zoological Museum at Upsala[1]). Quite similar Leptocephali occur in collections made for Kommissionen for Havundersøgelser by H. M. S. "Ingolf" at in the neighbourhood of the



Chlopsis bicolor Raf.
Larva 58 mm. in length. "Thor" Stat. 156, 32° 24′ N. Lat., 26° 51′ E. Long., July 30, 1910.

West Indies. These show, that the genus *Chlopsis* is not restricted to the Mediterranean, but is also represented in the western part of the Northern Atlantic.

[1]) I may take this opportunity to repeat, that the Leptocephalus described by me in 1909 under the name of *L. hyoproroides* has nothing to do with Strömman's species of that name. I had overlooked, that this name was already occupied and I have later given my species the name *Leptocephalus thorianus* (see Zool. Anzeiger, XXXVI, 1910).

25. March 1912.

Report on the Malacostraca collected by the "Tjalfe"-Expedition, under the direction of cand. mag. Ad. S. Jensen, especially at W. Greenland.

By

K. Stephensen.

During the fisheries-investigations carried out by Mr. Ad. S. Jensen in the Greenland seas, especially at S. W. Greenland, with the "Tjalfe" in the summers 1908 and 1909, a considerable material of Crustaceans was collected. Especially bathypelagic species and larvæ of such species are richly represented in the collection, this expedition standing foremost among those, by which such material has been brought to light. It was, however, by no means the whole material of Crustaceans, which was preserved, particularly of the more common species, the main object of the expedition being fisheries-investigations, not a general survey of the marine fauna.

The material contains in all 84 species and 6 species of larvæ. The following species are new to science.

Cleonardo microdactylus. (No. 57).

Eusirus Tjalfiensis. (No. 67).

Munneurycope Tjalfiensis. (No. 80).

Holophryxus Acanthephyræ. (No. 84).

Besides these the following species are new to Greenland:

Longithorax fuscus H. J. Hansen.

Scina sp.

Cyphocaris anonyx Boeck.

Metacyphocaris Helgæ Tattersall.

Katius obesus Chevreux.

Amphitopsis longicaudata Boeck.

Acanthoniscus typhlops G. O. Sars.

Janthe laciniata G. O. Sars.

Holophryxus Richardi Koehler.

A summary and discussion of the new localities in connection with those previously known I have given recently in the Report on the Malacostraca, Pycnogonida and some Entomostraca collected by the Danmark-Expedition to North-East Greenland, in "Meddelelser om Grønland", vol. 45, 1912.

Some of the stations from the Davis-Strait having great interest, a complete list is given here of all the species brought home from these stations.

St. 322. 60° 07′ N, 48° 26′ W, 3—5—1909. 2000 m. wire out.

Acanthephyra purpurea ca. 15 spec.
Parapasiphae sulcatifrons 2 spec.
Gennadas elegans 7 spec.
Sergestes arcticus 4 spec.
Thysanopoda acutifrons 30 spec.
Meganyctiphanes norvegicus 7 spec.
Thysanoessa longicaudata many spec. (ca. 15 cm.[3])
Eucopia unguiculata 5 spec.
Gnathophausia zoea 2 spec.
Boreomysis microps 7 spec.
Longithorax fuscus 1 spec.
Hyperia medusarum 1 spec.
Euthemisto compressa 6 spec.
Cyphocaris anonyx 5 spec.
Katius obesus 2 spec.
Metacyphocaris Helgæ 6 spec.
Munneurycope Tjalfiensis 1 spec.
Holophryxus Acanthephyræ 1 spec.

St. 333. 63° 18′ N, 54° 55′ W, 7—5—1909. depth 1300 m., 1530 m. wire out.

Acanthephyra purpurea 12 spec.
Parapasiphae sulcatifrons 4 spec.
Gennadas elegans ca. 15 spec.
Sergestes arcticus 1 spec.
Eucopia unguiculata ca. 25 spec.
Gnathophausia zoea 5 spec.
Boreomysis microps ca. 20 spec.
Cyphocaris anonyx 2 spec.
Katius obesus 2 spec.
Metacyphocaris Helgæ 5 spec.
Lanceola serrata 1 spec.

St. 338. 64° 01′ N, 55° 30′ W, 8—5—1909. depth 1185 m. 1500 m. wire out.

Acanthephyra purpurea 11 spec.
Parapasiphae sulcatifrons 5 spec.
Gennadas elegans 13 spec.
Boreomysis microps ca. 20 spec.
Scina sp. 1 spec.
Cyphocaris anonyx 2 spec.
Katius obesus 1 spec.
Metacyphocaris Helgæ 2 spec.

St. 336. 64° 06′ N, 55° 18′ W, 8—5—1909. depth 1040—1100 m., 1200 m. wire out.

Acanthephyra purpurea 10 spec.
Parapasiphae sulcatifrons 6 spec.
Gennadas elegans ca. 25 spec.
Sergestes arcticus 1 spec.
Thysanoessa longicaudata 1 spec.
Eucopia unguiculata 6 spec.
Gnathophausia zoea 7 spec.
Boreomysis microps ca. 25 spec.
Cyphocaris anonyx 2 spec.
Cleonardo microdactylus 2 spec.

Decapoda.

1. **Chionoecetes Opilio** O. Fabr.

Cancer Phalangium O. Fabricius, Fauna Groenlandica, 1780, No. 214, p. 234.
— *Opilio* O. Fabricius, Kgl. Danske Vid. Selsk. Skrifter, Nye Samling, vol. 3, 1788, p. 181, 1 Pl.
Chionoecetes Opilio Kröyer, Naturh. Tidsskrift, vol. 2, 1838, p. 249.
* — — Kröyer, Crust., in Gaimard, Voyage en Scand., 1846 (1849?), Pl. 1.
— — M. Rathbun, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 74, Pl. 4, fig. 5—7.
— — A. M. Edwards & Bouvier, Rés. des Camp. Sc. "Hirondelle", Monaco, vol. 7, 1894, p. 16.
— — H. J. Hansen, "Ingolf" 1908, p. 12.
— *phalangium* H. J. Hansen, V. Grönland 1887, p. 28.

(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fath. 5—7—1908. 3 spec.
(St. 107) 68° 20′ N, 54° 03′ W, 220—280 fath. 9—7—1908. 1 spec. (the carapace 93 mm. × 93 mm.)

In Disko Bay and in Umanak Fjord considerable numbers of this crab were taken in deep water (140—260 fms.), the largest specimen measuring 30 inches between the tips of the longest legs.

2. **Hyas coarctatus** Leach.

Hyas coarctatus Leach, Transact. Linn. Soc., London, vol. 11, 1815, p. 329.
— — Cuvier, Règne animal, Edit. acc. de planches grav., Crust.. Pl. 32, fig. 3.
* — — Brandt, Middendorffs Sibirische Reise, vol. 2, 1, 1851, p. 81.
* — — Bell, 1853, . 35, with fig.
— — M. Rathbun, Proc. U. S. Nat. Mus., vol. 16, 1893 p. 69.

Hyas coarctatus H. J. Hansen, „Ingolf" 1908, p. 15.
— — V. Grönland 1877, p. 30.

(St. 465) 62° 58′ N, 50° 52′ W, ca. 25 fath., 21—6—1909. 7 spec.
(St. 419) 65° 09′ N, 53° 33′ W, 29 fath. 6—6—1909. 1 spec.
(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fath., 5—7—1908. ca. 20 spec.

3. **Lithodes Maja** L.

Cancer Maja Linné, Systema Naturæ, edit. X, 1758, vol. 1, p. 629.
Lithodes arctica Cuvier, Règne animal, Edit. acc. de planches grav., Crust., Pl. 37.
* — *Maja* Bell, 1853, p. 165, with fig.
* — *arctica* Bouvier, Ann. Sc. Nat. Zool., ser. 7, vol. 18, 1891, p. 181, Pl. 11, fig. 7, Pl. 12, fig. 5.
— *Maja* Bouvier, ibid., ser. 8, vol. 1, 1896, p. 24.
— — H. J. Hansen, "Ingolf", 1908, p. 22.
— — — V. Grønland, 1887, p. 31.

(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fath., 5—7—1908, 1 spec.
Without locality, 1 sp.

4. **Eupagurus pubescens** Kr.

Pagurus pubescens Kröyer, Kgl. Danske Vid. Selsk. naturvid.-math. Afh., vol. 7, 1838, p. 314.
* — — Kröyer, Naturhist. Tidsskrift, vol. 2, 1838, p. 251.
* — — — in Gaimard: Voyage en Scandinav., 1846 (1849?). Pl. 2, fig. 1.
Eupagurus — + *E. Kröyeri* S. J. Smith, Transact. Conn. Acad. vol. 5, 1879. p. 47, 48.
— — A. M. Edwards & Bouvier, Résult. d. Camp. Sc. "Hirondelle", Monaco, vol. 7, 1894, p. 74.
— — H. J. Hansen, "Ingolf", 1908, p. 27.
— — — V. Grönland, 1887, p. 32.

(St. 177) 70° 42′ N, 54° 48′ W, 253 fath. 7—8—1908. 2 spec.

5. **Munida tenuimana** G. O. Sars.

Munida tenuimana G. O. Sars, Vid. Selsk. Forh., Christiania 1871 (1872), p. 247.
— — — Ibid. 1882, No. 18, p. 44, Pl. 1, fig. 6.
* — — Appellöf, Die Decap. Crust., Meeresfauna v. Bergen, Heft 2—3, 1906, p. 139—49, Pl. 2, fig. 2.
* — — H. J. Hansen, "Ingolf" 1908, p. 34, Pl. 2, fig. 4 a, Pl. 3, fig. 1 a.

(St. 429) 63° 54′ N, 53° 15′ W. 988—1400 m. trawl. 8—6—1909. 3 spec.

6. **Munidopsis curvirostra** Whiteaves.

Munidopsis curvirostra Whiteaves, Ann. Journ. Science ser. 3, vol. 8, 1874, p. 212.
— — S. J. Smith, Bull. Mus. Comp. Zool., vol. 10, 1884, p. 21 (no description), Pl. 8, fig. 2, 3, 3 a.
* — *longirostris* A. Milne-Edwards & Bouvier, Exp. Sc. "Travailleur" et "Talisman" Crust. Decap. vol. 1, 1900, p. 314, Pl. 4, fig. 1, Pl. 30, fig. 6—10.
* — *curvirostra* H. J. Hansen, "Ingolf", 1908, p. 36, pl. 3, fig. 2.

(St 337) 64° 05′ N, 55° 20′ W, 1100 m. 8—5—1909. 1 spec.
(St. 408—10) 64° 14′ N, 55° 55′ W, 839 m. 2—6—1909. 3 spec.
(St. 302) 64° 40′ N, 56° 37′ W, 720—775 m. 2—6—1909. 2 spec.

6. **Sclerocrangon boreas** Phipps.

Cancer Boreas Phipps, Voyage towards the North Pole, 1774, p. 190, Pl. 12, fig. 1.
**Crangon* — Kröyer, Naturhist. Tidsskrift vol. 4, 1842, p. 218, Pl. 4, fig. 1—14.
Sclerocrangon Boreas H. J. Hansen, "Ingolf" 1908, p. 47.
— — — V. Grønland, 1887, p. 33.

(St. 371) 66° 44′ N, 56° 16′ W, ca. 150 fm. 20—5—1909. 1 spec. (72 mm.)
(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fm. 5—7—1908. 1 spec. (73 mm.)

The great depths have some interest, as H. J. Hansen (Ingolf, p. 48) writes: "It was taken at all depths from ca. 5 fm. to 118 fm., but a single occurrence at 200 fm. must . . . be considered as less certain".

8. **Sabinea hystrix** A. Milne-Edwards.

Paracrangon hystrix A. Milne.Edwards, Ann. Sc. Nat., ser. 6, Zool., vol. 11, 1881, p. 6.
**Sabinea princeps* S. J. Smith, Bull. Mus. Comp. Zool., vol. 10, 1882, p. 38, Pl. 8, fig. 1.
— *hystrix,* H. J. Hansen, "Ingolf", 1908, p. 51.

(St. 337) 64° 05′ N, 55° 20′ W, 1100 m. 8—5—1909. 1 spec. (110 mm.)

9. **Nectocrangon lar** Owen.

Crangon lar Owen, Zool. of Capt. Beechey's Voyage, 1839, p. 88, Pl. 28, fig. 1.
**Argis* — Kröyer, Naturh. Tidsskrift, vol. 4, 1842, p. 255, Pl. 5, fig. 45—62.
Nectocrangon lar + *N. dentata* M. Rathbun, Harriman Alaska-Exp., 1904, p. 137 with figs.) (teste H. J. Hansen, Ingolf).

Nectocrangon lar H. J. Hansen, "Ingolf", 1908, p. 49.
— — — V. Grönland, 1887, p. 37.

(St. 183) 69° 19′ N, 52° 56′ W. 78 fm., 10—8—1908, 1 spec.
(St. 179) 69° 29′ N, 55° 26′ W, 116 fm., 8—8—1908, 1 spec.

10. **Spirontocaris spinus** Sow.

Cancer spinus Sowerby, Brit. Miscellany, 1806, p. 47, Pl. 23.
**Hippolyte Sowerbei* Kröyer, Danske Vid. Selsk. math.-naturvid. Afh., vol. 9, 1842, p. 298, Pl. 2, fig. 45—54.
— *spinus* Hoek, Niederl. Arch f. Zool., Supplbd. I, Crust., 1882, p. 15, Pl. 1, fig. 4—7.
* — — Birula, Ann. Mus. Zool. Acad. Imp. St. Pétersbourg, vol. 1, 1899, p. 30, fig. 1.
Spirontocaris spinus H. J. Hansen, "Ingolf", 1908, p. 58.
— — Kemp, Decap. Ireland, 1908 (1910), p. 103, Pl. 14, fig. 1.
Hippolyte — H. J. Hansen, V. Grønland, 1887, p. 41.

(St. 371) 66° 44′ N, 56° 16′ W, ca. 150 fm. 20—5—1909. 1 spec.

11. **Spirontocaris Gaimardii** H. Milne-Edwards.

Hippolyte Gaimardii H. Milne-Edwards, Hist. Nat. Crust., vol. 2, 1837, p. 378.
* — — + *H. gibba* Kröyer, Kgl. Danske Vid. Selsk. math.-naturv.-Afh., vol. 9, 1842, p. 282, 288, Pl. 1, fig. 21-30, Pl. 2, fig. 31—37.
Euales obses J. Thallwitz, Decapoden-Studien 1891, p. 23.
Hippolyte Gaimardii Appellöf, Decap. Crust., Meeresfauna v. Bergen, Heft 2—3, 1906, p. 122, Pl. 2, fig. 4.
Spirontocaris — H. J. Hansen, "Ingolf" 1908, p. 56.
Hippolyte — — V. Grönland, 1886, p. 39.

(St. 183) 69° 19′ N, 52° 56′ W, 78 fm. 10—8—1908, 7 spec.
(St. 179) 69° 29′ N, 55° 26′ W, 116 fm. 8—8—1908, 6 spec.

The largest specimen, from St. 179, is 93 mm. long. On one spec. the rostrum is bent upwards about as in *Pandalus propinquus*. All the specimens have a large curved process on the third abdominal segment, except the smallest specimen (44 mm.), which has but an inconsiderable tooth.

12. **Spirontocaris macilenta** Kr.

Hippolyte macilenta Kröyer. Naturh. Tidsskrift vol. 3, 1841, p. 574.
* — — — Kgl. Danske Vid. Selsk. math.-naturvid. Afd., vol. 9, 1542, p. 305, Pl. 2, fig. 55—56.

Hippolyte macilenta S. J. Smith, Transact. Conn. Acad. vol. 5, 1879, p. 71.
Spirontocaris — H. J. Hansen, "Ingolf" 1908, p. 60.
Hippolyte — — V. Grønland, p. 43.

(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fm. 5—7—1908. 1 spec.
(St. 183) 69° 19′ N, 52° 56′ W, 75 fm. 10—8—1908. 7 spec.
(St. 179) 69° 29′ N, 55° 26′ N, 116 fm. 8—8—1908. 5 spec.

The species seems to be very rare at W. Greenland (H. J. Hansen l. c.). 3 of the spec. from St. 179 are infested with *Phryxus abdominalis*, and on one spec. from St. 100 *Bopyroides hippolytes* was found; till now the species was not known as a host for any of these Bopyridæ.

13. **Spirontocaris turgida** Kr.

Hippolyte turgida + *H. Phippsii* Kröyer, Naturh. Tidsskrift vol. 3, 1841, p. 575.
* — — — — Kgl. Danske Vid. Selsk. math.-naturvid. Afh., vol. 9, 1842, p. 308, 314, Pl. 2, fig. 57—58, Pl. 3, fig. 59—68.
— *Phippsii* S. J. Smith, Transact. Conn. Acad., vol. 5, 1879, p. 73.
Spirontocaris turgida H. J. Hansen, "Ingolf" 1908, p. 61.
Hippolyte Phippsii — V. Grønland 1887, p. 43.

(St. 165) 62° 58′ N, 50° 52′ W, ca. 25 fm. 21—6—1909. 3 spec.

On one spec. the Bopyrid *Phryxus abdominalis* was found.

14. **Spirontocaris polaris** Sab.

Alpheus polaris Sabine, Suppl. to the App. of Capt. Parry's Voyage, 1824, p. 238, Pl. 2, fig. 5—8.
**Hippolyte polaris* + *H. borealis* Kröyer, Kgl. Danske Vid. Selsk. math.-naturvid. Afh., vol. 9, 1842, p. 324, 330, Pl. 3, fig. 74—81, Pl. 4, fig. 82.
— — S. J. Smith, Transact. Conn. Acad. vol. 5, 1879, p. 80.
— *Amazo* Pfeffer, Jahrb. wiss. Anst. Hamburg, vol. 3, 1866, p. 36, fig. 6.
Spirontocaris polaris H. J. Hansen, "Ingolf" 1908, p. 63.
Hippolyte — — V. Grønland, 1887, p. 45.

(St. 465) 62° 58′ N, 52° 52′ W, ca. 25 fm. 21—6—1909. ca. 60 spec.
(St. 419) 65° 09′ N, 53° 33′ W, 29 fm. 6—6—1909. 1 spec.
(St. 371) 66° 44′ N, 56° 16′ W, ca. 150 fm. 20—5—1909. 1 spec.

One of the specimens from St. 465 is infested with *Bopyroides hippolytes*.

15. **Pandalus borealis** Kr.

Pandalus borealis Kröyer, Naturh. Tidsskrift vol. 2, 1838, p. 254.
— — — Ibid., Ny Række, vol. 1, 1845, p. 461.
— — — in Gaimard, Voyage en Scand., 1846 (1849?), Crust, Pl. 6, fig. 2.
* — — G. O. Sars, Report on Norw. Fish- and Marine-Invest. vol. 1, 1900, No. 3, p. 31, Pl 9—10.
— — H. J. Hansen, "Ingolf" 1908, p. 70.
— — — V. Grønland, 1887, p. 49.

The Channel outside Nanortalik (ca. 60° N), 6—9—1909. 5 spec., from stomachs of Gadus ogak.
(St. 341) 64° 34′ N, 53° 20′ W, 200 m. wire, 9—5—1909. 9 spec.
(St. 183) 69° 19′ N, 52° 56′ W, 78 fm. 10—8—1908. 2 spec.

The specimens from St. 341 have very large eyes.

This shrimp was otherwise taken very often, sometimes in great numbers, as e. g. W. of "Store Hellefiske" bank, where in a depth of 175 fms. many liters were taken in one haul with otter-trawl: the largest specimens measured 15.5 cm. in length (30 cm. with the antennæ).

16. **Pandalus propinquus** G. O. Sars.

Pandalus propinquus G. O. Sars, Forh. Vid. Selsk. Christiania 1869 (1870), p. 148.
— — S. J. Smith, Rep. U. S. Comm. Fish and Fisheries 1885 (1886) Pl. 13, fig. 1.
— — Calman, Ann. Mag. Nat. Hist. ser. 7, vol. 3, 1899, p. 32, Pl. 1—4, fig. 2.
— — H. J. Hansen, "Ingolf" 1908, p. 72.
— — Kemp, Decap. Natant, Ireland, 1908 (1910), p. 89, Pl. 11, fig. 1—4.

(St. 429) 63° 54′ N, 53° 15′ W, 988—1400 m. trawl. 8—6—1909. 1 spec.

17. **Acanthephyra purpurea** A. Milne-Edwards.

Acanthephyra purpurea A. Milne-Edwards, Comp. Rend. Ac. Sc. Paris, vol. 93, 1881, p. 933.
**Miersia Agassizii* S. J. Smith, Bull. Mus. Comp. Zool. vol. 10, 1882, p. 67, Pl. 11, fig. 5—7, Pl. 12, fig. 1—4.
**Acanthephyra purpurea* Kemp, Fisheries, Ireland, Sci. Invest. 1905 part 1 (1906), p. 4—16, Pl. 1, Pl. 2, fig. 1—3 (ubi Litt. et Syn.).
— — H. J. Hansen, "Ingolf" 1908, p. 75.

Acanthephyra purpurea Kemp, Decap. Natant. Ireland, 1908 (1910) part 1, p. 56.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909. 15 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1530 m. wire, 7—5—1909. 12 spec.
(St. 338) 64° 01′ N, 55° 30′ W, 1185 m. wire, 8—5—1908. 11 spec.
(St. 336) 64° 06, N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 10 spec.

H. J. Hansen (l. c.) mentions the species from 6 stations, but he has only 1 spec. from each stat. Kemp (1908, l. c.) mentions the species from 32 stations (6 of which are from the Danish investigations steamer "Thor"), but he has, as Hansen, from most of the stations only 1 specimen; the largest number from a single stat. is five, and that is but a single occurrence.

One of the specimens from St. 322 is infested with *Holophryxus Acanthephyræ* K. St. (fam. Dajidæ) (No. 84).

18. **Pasiphae tarda** Kr.

Pasiphae tarda Kröyer, Naturh. Tidsskrift, ser. 2, vol. 1, 1844—45, p. 453.
— — — in Gaimard, Voyage en Scandinavie, 1846 (1849) Crust., Pl. 6, fig. 1.
Pasiphae norvegica M. Sars, Bidrag til Kundskaben om Kristianiafjordens Fauna, Nyt Magasin f. Naturvid, vol. 15, 1868, p. 282, Pl. 4, Pl. 5, fig. 81, fig. 87—90.
— *tarda* G. O. Sars, Oversigt af Norges Crust., Vid. Selsk. Forhandl., Kristiania, 1882, No. 18, p. 48.
— — H. J. Hansen, "Ingolf" 1908, p. 78.
— — — V. Grønland, 1887, p. 51.
— — Wollebæk, Decap. Crust. 1—2, Bergens Musæums Aarbog 1908, No. 12, p. 72, Pl. 13.
— — K. Stephensen, Revideret Fortegn. over Danmarks marine Arter af Decap., Vid. Meddel. Naturh. Foren. København 1909 (1910) p. 289.
— — Kemp, Decap. Natant. Ireland 1908 (1910) p. 39—42, Pl. 4, fig. 8—11.
— *princeps* S. J. Smith, Rep. Decap. Crust. "Albatross" East coast U. S., Rep. U. S. Fish Commission 1882 (1884) p. 381, Pl. 5. fig. 2.
— — S. J. Smith, Report on the Decap. Crust. "Albatros" Eastcoast U. S., Rep. U. S. Fish Commission 1885 (1887), p. 609, 612, 613, 617, 619, 682.
— — Kemp, Decap. Natant. Ireland, 1908 (1910) p. 42—47, Pl. 4, fig. 1—7.

(St. 15) 58° 08′ N, 39° 24′ W. 500 m. wire, 26—5—1908. 2 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1300 m. wire, 23—6—1908. 1 spec.
(St. 429) 63° 54′ N, 53° 15′ W, 988—1400 m. 8—6—1909. 1 spec.
(St. 407—08) 64° 14′ N, 55° 55′ W, 839 m, clay, 2—6—1909. 1 spec.

Kemp (l. c. 1908 (1910) p. 42—43) has given a synopsis of the characteristics of *P. tarda* Kröyer and *P. princeps* S. J. Smith. Kröyer has published his description in Danish, and it seems that owing to this foreigners have not been able to read his description; otherwise Smith would probably not have founded *P. princeps* as a new species. In order to show the great agreement in the descriptions of Kröyer and Smith, I have made the following synopsis of the most important characters.

P. tarda Kröyer. (Naturhist. Tidsskrift, ser. 2, vol. 1, 1844—45, p. 453 seq.)	*P. princeps* S. J. Smith. (Report U. S. Fish Commission for 1882 (1884), p. 381 seq.)
1. "The carapace, which is about 1/3 of total length or half as long as the pleon including telson, is very much compressed". (From Kröyer's fig. in Gaimard: Voyage en Scandinavie, the carapace is seen to be 39 mm., abdomen excluding telson 59 mm.).	1. The pleon exclusive of the telson is about one half longer than the carapace". (Carapace 75 mm., pleon excluding the telson 112 mm.).
2. "On the dorsum of the carapace is seen a sharp, but smooth carina, which goes about to the hinder edge of the carapace, terminating anteriorly in a little, mucronate and very much compressed rostrum, that .... projects a little the anterior edge of the carapace".	2. "The dorsum of the carapax is rounded except for about a third of the length anteriorly, where it rises into a carina terminating in a short, mucronate and obliquely upturned rostrum overhanging, but projecting scarcely as far forwards as the front itself, which is prominent though rounded in outline as seen from above".

3. "The antennal scale is large . . . . , lengthened ovate (more than 3 times as long as the breadth), apically rounded, without spines[1])" (the length is (in the fig. in Gaimard: Voyage) 17 mm., the breadth 4 mm.).

3. Antennal scale is . . . . scarcely a third as broad as long, and the outer edge arcuate and terminating in an acutely triangular lamellar tooth" (scale: length 29 mm.) breadth 8.8 mm.).

4. "The abdomen is provided along the whole middle line of the dorsum with a very conspicuous carina."

4. "The second, third, fourth and fifth somites are dorsally carinate, the fourth and fifth most conspicuously. The sixth somite is . . . . compressed, but scarcely carinated dorsally".

5. (Telson) "The tip is strongly cut into a sharp angle".

5. (Telson) "The tip (is) divided by a narrow sinus".

6. (Second pair of pereiopods). "The second joint has on the lower edge towards the end 3 spines" (about the third joint Kröyer says nothing).

6. "The second pair (of pereiopods) are armed with a few small spines along the lower edge of the propodus, and the lower distal angle of the carpus is produced into a sharp spine, but are otherwise nearly like the first pair . . . (smooth, naked and unarmed").

---

[1]) About this G. O. Sars writes (Christiania Vid. Selsk. Forh. 1882, No. 18, Oversigt af Norges Crustaceer, p. 48) (in translation from Norwegian): "I have had opportunity myself to examine the type-specimen of Kröyer in the Copenhagen-Museum and have convinced myself that the spine in the antennal plate originally has been present, but has accidentally been broken in the present specimen". — At the present moment (1912) we have in the Zoological Museum in København (Copenhagen) only the mentioned specimen from the time of Kröyer, provided with the following note (in the hand writing of J. C. Schiödte), "*Pasiphae tarda* Kr. Sydl. Grønland; Jørgensen Kr." Unquestionably it is this specimen, about which Kröyer writes (l. c., 1844—45; the foot-note p. 455) "in one of the specimens the carina anteriorly had an incision, that made, so to speak, two humps; but this seems to be caused by an accidental damage".

As it may be seen the agreement is very close. The differences are not greater, than that they may be ascribed to individual variations (we must remember, that Kröyer had but two specimens, Smith even but one specimen).

The Zoological Museum in Copenhagen has a very large material, towards 1000 specimens of *P. tarda* Kr., of which the greater part has been captured in the Skagerak. To convince myself, that there were no specimens of *P. princeps* Smith in the material, that hitherto (by H. J. Hansen in "Ingolf" 1908 and by myself in "Vid. Meddel. Naturh. Foren." Kbhvn. 1909) has been determined as *P. tarda* Kr., I have examined each of the specimens, but the result has been quite different from what might be expected, as will be seen from the following.

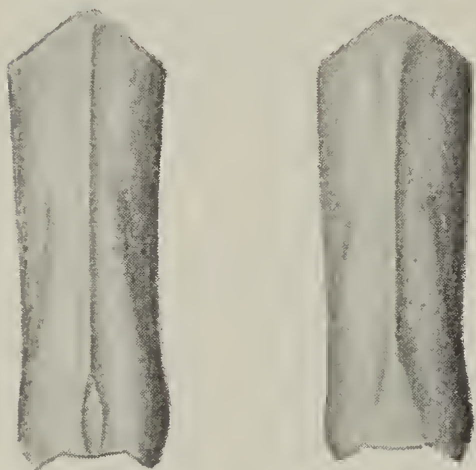


Fig. 1. Dorsal view of the 6th abdominal segment of *Pasiphae tarda* and *Pasiphae princeps*.

Kemp is right, that a great part of the specimens may be referred to one of the two principal forms; but as my investigations have shown, they are combined with numerous intermediate links.

Rostrum varies so much, that it can not be used as a distinguishing character. The best characters are, according to my investigations, the sixth abdominal segment, the antennal plate and the spines of the basis of the second pereiopod; but these spines are not to be found in specimens smaller than 25—40 mm., and even in larger specimens their number is varying. G. O. Sars says (l. c. 1882, p. 48) "the number of spines in the two first pairs of pereiopods is a characteristic too inconstant to be considered as a real specific characteristic". Nevertheless we may in most cases use the characteristic of Kemp (l. c. 1908 (1910) p. 42—43) to separate the two "species" (specimens more than 30—40 mm. long).

Besides I have found a characteristic, that I have not seen

described anywhere in the literature, viz. the carina in the sixth abdominal segment. This carina goes in the specimens, that from the antennal plate and the second pereiopod are to be ascribed to *P. tarda*, just to the hind edge of the segment (fig. 1), but is in the hinder part divided into two almost parallel carines; in *P. princeps* the hinder part of the segment is simply compressed without any carina (fig. 1).

That the proportion in the length of antennal plate, carapace and abdomen cannot be used, appears from the following measurements; the specimens are determined from the shape of antennal plate, carapace and sixth abdominal segment) (the measurement are in mm.)

P. tarda

Locality	Total length	Antennal plate	Carapace	Abdomen excl. telson
Skagerak	83	12	25	46
—	70	10	21	40
—	79	12	24	44
—	68	9,5	20	30
—	101	14	33	65
62° 49' N, 18° 46' W.	73	11	23	42

P. princeps.

Locality	Total length	Antennal plate	Carapace	Abdomen excl. telson
S. Greenland (Kröyer's type—specimen of *P. tarda*!)	108	imperfect	38	58
67° 19′ N, 15° 52′ W.	60	10	19	33
65° 28′ N, 27° 29′ W.	90	13	25	48

Even the form of the antennal plate may cause some difficulty. Thus I have seen one, otherwise somewhat typical *P. tarda* from the Skagerak, whose right antennal plate is as in *P. princeps*, whilst the left has the same form as in *P. tarda* (Kemp l. c., 1908 (1910), pl. 4, fig. 9); but from the measurements (antennal plate 10,5, carapace 23, abdomen excl. telson 38) it might be determined as *P. princeps*.

Of *P. norvegica* M. Sars, that in all essentials is like Kemp's description of *P. tarda*, G. O. Sars writes: (l. c. 1882, p. 49) "there is no doubt that the species *P. norvegica* described by my father . . . is identic with the species of Kröyer". That upon the whole the single specimens determined by Kröyer as *P. tarda* suit the description of *P. princeps*, is evident from the agreement of the descriptions of Kröyer and Smith, and as the two "species" are combined with intermediate links, we must unquestionably obliterate *P. princeps* Smith as species and take the name but as syn. of *P. tarda* Kröyer.

19. **Parapasiphae sulcatifrons** S. J. Smidt.

Parapasiphae sulcatifrons S. J. Smith, Rep. Comm. Fish and Fishery for 1882, (1884) p. 384 Pl. 5, fig. 4, Pl. 6, fig. 1—7
— — H. J. Hansen, "Ingolf" 1908, p. 79.
* — — Kemp, 1908 (1910), p. 47, Pl. 5.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m., wire, 3—5—1909. 2 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1905. 5 spec.
(St. 338) 64° 01′ N, 55° 30 W, 1185 m., 1400—1500 m. wire, 8—5—1909. 5 spec.
(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909. 6 spec.
(St. 348) 64° 35′ N, 56° 18′ W, 900 m. wire, 11—5—1909. 4 spec.

New to W. Greenland. The largest specimen is from St. 333 and is 71 mm. long.

20. **Gennadas elegans** S. J. Smith.

Amalopenæus elegans S. J. Smith, Bull. Mus. Comp. Zool. vol. 10, 1882, No. 1, p. 87, Pl, 14, fig. 8—14, Pl. 15, fig. 1—15.
**Gennadas* — Bouvier, Rés. Comp. Sc., Monaco, fasc. 33, (Pénéides), 1908, p. 25 (distrib.), p. 28 (key to the species of the genus) p. 35 (Syn. and litt.).
— — Bouvier, Bull. Mus. Océan. Monaco, No. 80, 1906.
Amalopenæus — Calman, Ann. Mag. Nat. Hist. ser. 7, vol. 11, 1903, p. 416.
Gennadas — H. J. Hansen, "Ingolf" 1908, p. 81.
**Amalopenæus* — Kemp, 1908 (1910), p. 14, Pl. 1.
— — H. J. Hansen, V. Grønland 1887, p. 52.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 7 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909, 7 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 15 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1000 m. wire, 23—6—1908, 1 spec.
(St. 338) 64° 01′ N, 55° 30′ W, 1185 m., 1400—1500 m. wire, 8—5—1909, 13 spec.
(St. 336) 64° 06′ N. 55° 18′ W, 1200 m. wire, 8—5—1909, ca. 25 spec.
(St. 408) 64° 14′ N. 55° 55′ W, 839 m. (trawl), 2—6—1909, 1 spec.
(St. 348) 64° 35′ N, 56° 18′ W, 900 m. wire, 11—5—1909, 6 spec.

It is very interesting, that the "Tjalfe" has taken so many specimens at each station; in "Ingolf" H. J. Hansen mentions but one specimen from each station; only at 2 stations were taken 2 specimens. The material from the "Tjalfe" thus fully confirms, what Bouvier says (Bull. Inst. Océanogr., Monaco, No. 97, 1907, p. 47—46): "le Gennadas élégans est l'espèce la plus commune du genre: il fut considéré comme une espèce rarissime aussi longtemps qu'on se borna aux pêches sur le fond; mais, depuis l'emploi du filet vertical, surtout de celui a grande ouverture, il apparâit très commun et doit être considéré comme un des éléments les plus caractéristiques de la faune bathypélagique dans nos régions. En Méditerranée, près des îles Baléares, et au centre de l'Atlantique, dans les régions des Sargasses, certains coups de filet nous donnérent jusqu'à trente spécimens de ce joli Pénéide. Au-dessus de 1000 mètres, on ne rencontre guère que les larves de l'espèce; au dessous apparaissent les adultes qui, d'ailleurs, ne semblent jamais se tenir sur le fond".

21. **Sergestes arcticus** Kr.

Sergestes arcticus Kröyer, Kgl. Danske Vid. Selsk. Skrifter, 5. Række, naturvid.-math. Afd., vol. 4, 1859, p. 240, Pl. 3, fig. 7, Pl. 5, fig. 16.
— — H. J. Hansen, "Ingolf" 1908, p. 82 (ubi litt. et syn.).
* — — Wasserloos, Zur Kenntnis d. Metamorphose von Serg. arct., Zool. Anzeiger, vol. 33, 1908, p. 327, with figs.
* — — Kemp, 1908 (1910), p. 30, Pl. 3, fig. 13—19.
— — H. J. Hansen, V. Grønland 1887, p. 52.

1. the stage *Sergestes Rinkii.*

(St. 1 a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, many spec. (1 cm.[3])
(St. 1 b) — — surface — — (3 cm.[3])

2. adults.

(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, 15 spec.
(St. 1 a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, 1 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, 10 spec.
(St. 322) — — 2000 m. wire, — 4 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909, 1 spec.
(St. 30 a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 15 spec.
(St. 30 b) — — 70 m. wire, — 2 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 1 spec.
(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 1 spec.
(St. 346) 64° 22′ N, 56° 00′ W, 800—400 wire, 10—5—1909, 1 spec.

The material states, that the species lives at W. Greenland; hitherto its occurrence there was doubtful (Kröyer).

The specimen from st. 346 in infested with *Holophryxus Richardi* Koehler (fam. Dajidæ) (No. 83).

Euphausiacea.

22. **Thysanopoda acutifrons** Holt & Tatt.

Thysanopoda pectinata H. J. Hansen, Bull. Mus. Océanogr., Monaco No. 30, 1905, p. 16, fig. 12.
— *acutifrons* Holt & Tattersall, Rep. Sea and Inland Fisheries, Ireland, 1902—03 (1905), pt. 2, app. No. IV, p. 102, 134.
— — H. J. Hansen, Bull. Mus. Océanogr. Monaco, No. 42, 1905, p. 22.
* — — Holt & Tattersal, Fisheries, Ireland, Sc. Invest., 1904, pt. 5 (1906), p. 8, Pl. 1.
— — H. J. Hansen, "Ingolf" 1908, p. 84.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 6, fig. 4—5.
? — *microphthalma* Ortmann, Plankton-Exp., vol. 2, G. b. 1893, p. 9.
non — *pectinata* Ortmann, ibid., p. 10.

(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, ca. 40 spec.
(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, ca. 30 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1000 m. wire, 23—6—1908, 1 spec.

New to W. Greenland.

23. Meganyctiphanes norvegica M. Sars.

Thysanopoda norvegica M. Sars, Forh. Skand. Naturforskermøde 1856 (1857), p. 169.
Nyctiphanes — G. O. Sars, Forh. Vid. Selsk. Christiania 1883, p. 24.
**Meganyctiphanes norvegica* Holt & Tattersall, Rep. Sea and Inland Fisheries, Ireland, 1902—03, pt. 2, No. IV, (1905), p. 105, 135, Pl. 16.
— — H. J. Hansen, "Ingolf" 1908, p. 85.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 8, fig. 8—9.
Nyctiphanes — Zimmer, Fauna arctica, vol. 3, 1904, p. 419.

(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, ca. 35 spec.
(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, ca. 15 spec.
(St. 3) 58° 39′ N, 30° 50′ W, surface, 14—5—1908, 3 spec.
(St. 303) 59° 28′ N, 33° 05′ W, surface, 26—4—1909, 1 spec.
(St. 1 a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, 2 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, 10 spec.
(St. 322) — — 2000 m. wire, — 7 spec.
(St. 302) 60° 10′ N, 28° 13′ W, surface, 25—4—1909, ca. 20 spec.

24. Thysanoessa inermis Kr.

= Rhoda inermis Kr. + Thysanoessa neglecta Kr.

(See H. J. Hansen, The genera and species of the order Euphausiacea, with account of remarkable variation. Bull. Inst. Océanogr., Monaco, No. 210, 1911, p. 8—13, 38).

A. Forma Rhoda inermis.

Thysanopoda inermis Kröyer in Gaimard, Voyage en Scand., Crust. 1846 (1849?). Pl. 7, fig. 2.
**Euphausia* — G. O. Sars, Forh. Vid. Selsk. Christiania 1882, No. 18, p. 9, 51, Pl. 1, fig. 15.
Boreophausia — G. O. Sars, Norske Nordhavs-Exp., Crust.. 1886, p. 13.
Rhoda — Stebbing, Ann. Mag. Nat. Hist., ser. 7, vol. 5, 1900, p. 10.
— — Zimmer, Fauna arctica, vol. 3, 1904, p. 420.
— — H. J. Hansen, "Ingolf" 1908, p. 86.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 11, fig. 11—12.
Boreophausia — H. J. Hansen, V. Grönland 1887, p. 53.

(St. 423) 65° 03′ N, 54° 16′ W, 120, 100 and 80 m. wire, 7—6—1909, 1 spec.

B. Forma Thysanoessa neglecta Kr.

Thysanopoda neglecta Kröyer, in Gaimard: Voyage en Scand., Crust., 1846 (1849?) Pl. 7, fig. 3.
**Thysanoessa borealis* G. O. Sars, Forh. Vid. Selsk., Christiania 1882, No. 18, p. 9, 52 Pl. 1, fig. 16—18.
— *neglecta* Zimmer, Fauna arctica, vol. 3, 1904, p. 423.
— — H. J. Hansen, "Ingolf" 1908, p. 89.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 19, fig. 28—29.
— — H. J. Hansen, V. Grønland 1887, p. 54.

(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, 1 spec.

25. **Thysanoessa longicaudata** Kr.

Thysanopoda longicaudata Krøyer, in Gaimard: Voyage en Scandinavie, Crust., 1846 (1849?), Pl. 8, fig. 1.
* *Thysanoessa tenera* G. O. Sars, Forh. Vid. Selsk. Christiania 1882, No. 18, p. 9, 53, Pl. 1, fig. 19—20.
— *longicaudata* Zimmer, Fauna arctica, vol. 3, 1904, p. 424.
* — — Holt & Tattersall, Rep. Sea and Inland Fisheries, Ireland, 1902—03 (1905), pt. 2, App. No. 2, p. 107, 138, Pl. 15.
— — H. J. Hansen, "Ingolf" 1908, p. 88.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 20, fig. 30—31.
— — H. J. Hansen, V. Grønland 1887, p. 54.

(St. 11) 57° 41′ N, 35° 28′ W, surface, 20—5—1908, 2 spec.
(St. 281) 57° 51′ N, 43° 57′ W. 500 m. wire, 29—9—1908, 15 spec.
(St. 285) 57° 51′ N, 43° 48′ W, 1000 m. wire, 29—9—1908, 15 spec.
(St. 286) 57° 59′ N, 41° 21′ W, 80—200 m. wire, 30—9—1908, ca. 35 spec.
(St. 23) 58° 01′ N, 51° 36′ W, surface, 1—6—1908, 3 spec.
(St. 13) 58° 08′ N, 39° 10′ W. 40 m. wire, 26—5—1908, many spec. (ca. 30 cm.[3]).
(St. 15) 53° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, many spec. (ca. 150 cm.[3]).
(St. 278) 58° 16′ N, 47° 12′ W, 200—80 m. wire, 28—9—1908, 20 spec.
(St. 308) 58° 20′ N, 41° 12′ W, 1000 m. wire, 28—4—1909, 20 spec.
(St. 5) 58° 23′ N, 34° 41′ W, surface, 16—5—1908, 2 spec.
(St. 6) 58° 24′ N, 34° 53′ W, surface, 16—5—1908, 10 spec.
(St. 292) 58° 24′ N, 30° 35′ W, 500 m. wire, 3—10—1908, many spec. (ca. 4 cm.[3]).
(St. 7) 58° 33′ N, 35° 49′ W, 150 m. wire, 17—5—1908, ca. 100 cm.[3]
(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, ca. 100 cm.[3]
(St. 313) 58° 38′ N, 46° 13′ W, surface, 29—4—1909, ca. 35 spec.

(St. 2) 58° 40′ N, 30° 40′ W, surface, 14—5—1908, ca. 35 spec.
(St. 19 a) 58° 41 N, 49° 44′ W, 100 m. wire, 31—5—1908, 15 spec.
(St. 19 b) — — 200 m. wire, — 15 spec.
(St. 316) 58° 59′ N, 50° 28′ W, 500 m. wire, 1—5—1909, 35 spec.
(St. 276) 59° 18′ N, 51° 00′ W, 80 m. wire, 27—9—1908, 15 spec.
(St. 1 a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, many sp. (30 cm.^{3}).
(St. 1 b) — — surface, — many sp. (5 cm.^{3}).
(St. 298) 59° 41′ N, 25° 02′ W, 500 m. wire, 6—10—1908, 1 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, many sp. (50 cm.^{3}).
(St. 322) — — 2000 m. wire, — many sp. (15 cm.^{3}).
(St. 326) 62° 05′ N, 53° 41′ W, 100 m. wire, 6—5—1909, many sp. (15 cm.^{3}).
(St. 270) 62° 21′ N, 51° 31′ W, 84 fath., 80 m. wire, 24—9—1908, 10 spec.
(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6—5—1909, 3 spec.
(St· 330) — — surface, 6—5—1909, many spec. (30 cm.^{3}).
(St. 30 a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, many sp. (10 cm.^{3}).
(St. 30 b) — — 70 m. wire, — many sp. (100 cm.^{3}).
(St. 433) 63° 05′ N, 54° 21′ W, 80—120 m. wire, 9—6—1909, 20 spec.
(St. 31 a & c) 63° 11′ N, 56° 23′ W, pelagic townet, 7—6—1908, 40 spec.
(St. 33 b) 63° 25′ N, 54° 34′ W, 200 m. wire, 8—6—1908, many (3 cm.^{3}).
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m. 1000 wire, 23—6—1908, 3 spec.
(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 1 spec.
(St. 405) 64° 25′ N, 56° 12′ W, 100 m. wire, 2—6—1909, many (3 cm.^{3}).
(St. 42) 65° 03′ N, 54° 16′ W, 80, 100, 120 m. wire, 7—6—1909, many (4 cm.^{3}).
(St. 196 d) 68° 40′ N, 53° 12′ W, 350 m.wire, 17—8—1908 many spec. (4 cm.^{3}).

26. **Rhoda Raschii** M. Sars.

Thysanopoda Raschii M. Sars, Forh. Vid. Selsk. Christiania, 1863, p. 83.
**Euphausia* — G. O. Sars, ibid. 1882, No. 18, p. 9, 51.
Boreophausia — Norman, Rep. Fish. Board Scotl., vol. 4, 1886, p. 156.
Rhoda — Zimmer, Fauna arctica vol. 3, 1904, p. 421.
— — H. J. Hansen, "Ingolf" 1908, p. 87.
**Boreophausia* — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 11 (fig.).
Thysanopoda — Vanhöffen, 1897. vol. 2, Pl. 1, fig. 1, p. 381 (nomen nudum) (coloured fig.)
Boreophausia — H. J. Hansen, V. Grønland 1887, p. 53.

(St. 11) 57° 41′ N, 35° 28′ W, surface 20—5—1908, 1 spec.
(St. 297) 59° 10′ N, 27° 44′ W, pelagic townet, 4—10—1908, 3 spec.
(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6— —1909, 1 spec.
(St. 30 a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 1 spec.
(St. 341) 64° 34′ N, 53° 20′ W, 200 m. wire, 9—5—1909, 0a. 50 spec.
(St. 196 d) 68° 40′ N, 53° 12′ W, 350 m. wire, 17—8—1908, 4 spec.
Tassiusak at Egedesminde, from the stomach of Gadus ogac, 12—8—1908, many spec. (40 ccm.)
(St. 171) 70° 41′ N, 52° 07′ W, 386 fath., 800 m. wire, 6—8—1008, 1 spec.
(St. 172) 70° 42′ N, 52° 14′ W, 450 m. wire, 6—8—1098, 8 spec.

27. **Nematoscelis megalops** G. O. Sars.

Nematoscelis megalops G. O. Sars, Forh. Vid. Selsk. Christiania for 1883, No. 7, p. 27.
* — — — Challenger Report, vol. 13, pt. 37, p. 127, Pl. 23, fig. 5—10, Pl. 24.
— — H. J. Hansen, Bull. Mus. Océanogr., Monaco, No. 30, 1905, p. 27.
— — Zimmer, Fauna arctica, vol. 3, 1904, p. 425.
— — H. J. Hansen, "Ingolf" 1808, p. 90.
— — — Siboga-Schizop., 1910, p 106.

(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, 3 spec.
(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, 1 spec.
(St. 1 a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, 9 spec. (2 ♀♀ with ova).

As recorded above 2 of the specimens from St. 1 a carry their ova. In "On propagation and early development of Euphausiidæ" in "Archiv for Mathematik og Naturvidenskab", vol. 20, 1898, No. 11, p. 9, G. O. Sars mentions but 4 species carrying their ovisacs, viz. *Nyctiphanes Couchii* (see also Holt & Tattersall, Schizop. from the N. E. Atlantic Slope, Ann. Rep. Fish. Ireland, 1902—03, No. 4 (1905) p. 104, Pl. 17, fig. 2), *N. australis*, *Nematoscelis microps* and *Stylecheiron carinatum*. Sars says "it is .... very probable, that these cases are quite exceptional, and that in the far greater number of Euphausiidæ the ova are at once ejected into the water". I have from the literature not been able to find later additions to Sars' list.

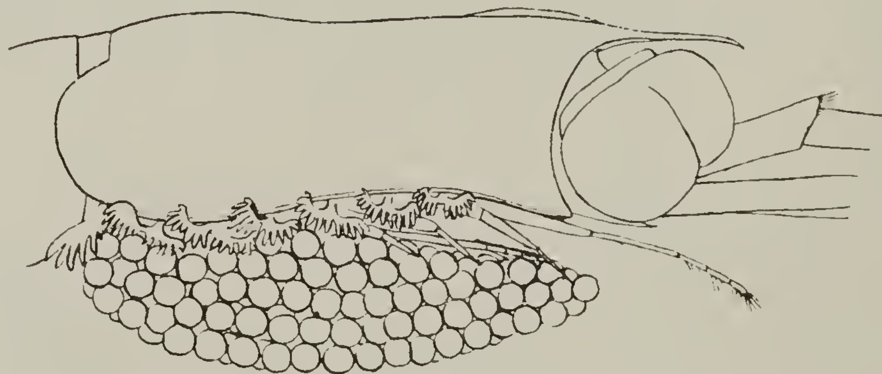


Fig. 2. *Nematoscelis megalops* with ovisac.

Nematoscelis megalops carries, as is shown by the figure (fig. 2), its ova in an ovisac pointed in front; seen from below it seems to be

composed of two parallel ovisacs and has about the same form as from the side, and it has about the same length as the carapace. The ova are (in alcohol) yellow, the diameter is 0,45 mm.

Mysidacea

28. **Gnathophausia zoea** Will.-Suhm.

Gnathophausia zoea Willemoes-Suhm, Nature, vol. 8, 1873, p. 401 fig. 1.
— — — Transact. Linn. Soc., ser. 2, vol. 1, 1875, p. 32, Pl. 9, fig. 2—15.
* — — G. O. Sars, Challenger Report, Zool., vol. 13, pt. 37, 1885, p. 44, Pl. 6, fig. 6—10.
* — *Willemoesii* G. O. Sars, ibid., p. 38, Pl. 5, fig. 1—6.
— *zoea* Zimmer, Nordisches Plankton, vol. 6, 1909, p. 34. (with figs).
— — H. J. Hansen., "Ingolf" 1908, p. 93.
— — — Siboga-Schizop., 1910, p. 17.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 2 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909, 12 spec.
(St. 32) 63° 16′ N, 55° 52′ W, surface, (at night) 8—6—1908, 1 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1530 m. wire, 7—5—1909, 5 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m. 1000 m. wire, 23—6—1908, 9 spec.
(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 7 spec.
(St. 344) 64° 22′ N, 55° 48′ W, 1040 m., 1200 m. wire, 10—5—1909, 4 spec.

The largest specimen is from St. 322 and is 70 mm. exclusive of the rostrum (which is broken). In "Ingolf" H. J. Hansen mentions the species from 9 localities; but he has from no station more than 1 specimen.

29. **Eucopia unguiculata** Will.-Suhm.

Charalaspis unguiculata Willemoes-Suhm, Transact. Linn. Soc., ser. 2, vol. 1. 1875, p. 37, Pl. 8.
(partim) *Eucopia australis* G. O. Sars, Challenger Report, Zool., vol. 13, pt. 37, 1885, p. 55, Pl. 9—10.
* — *unguiculata* H. J. Hansen, Bull. Mus. Monaco, No. 42, 1905, p. 3.
— — — "Ingolf" 1908, p. 95.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 37, fig. 59—60.
— — H. J. Hansen, Siboga-Schizop, 1910, p. 20.

non *Eucopia australis* Dana, U. S. Expl. Exp., Crust., vol. 1, 1852, p. 609, p. 40, fig. 10 (teste Zimmer, l. c.)

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 5 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, ca. 25 spec.
(St. 336) 64° 06″ N, 55° 18′ W, 1040—1000 m., 1200 m. wire, 8—5—1909, 6 spec.

In "Ingolf" H. J. Hansen mentions but a single specimen from the Davis-Straits (61° 50′ N, 56° 21′ W, 1435 fm.).

30. **Boreomysis tridens** G. O. Sars.

Boreomysis tridens G. O. Sars, Vid. Selsk. Forh., Christiania, 1869 (1870), p. 153.
* — — — Monografi Norges Mysider, III, 1879, p. 17, Pl. 14.
— — H. J. Hansen, "Ingolf" 1908, p. 100.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 59, fig. 91—94.

(St. 402) 64° 40′ N, 56° 37′ W, 720—775 m., trawl, 2—6—1909, 10 spec.

32. **Boreomysis nobilis** G. O. Sars.

Boreomysis nobilis G. O. Sars, Archiv f. Math. og Naturv., vol. 4, 1879, p. 428.
**Boreomysis nobilis* G. O. Sars, Norske Nordhavs-Exp., Crust., 1885, p. 54, Pl. 5, fig. 22-28.
— — Ohlin, 1901, p. 70, fig. 3.
— — Zimmer, Fauna arctica, vol. 9, 1904, p. 432.
— — H. J. Hansen, Ingolf 1908, p. 101.
— — Zimmer, Nordisches Plankton, vol. 6, 1909, p. 56, fig. 83—86.
— — H. J. Hansen, V. Grønland 1887, p. 214.

(St. 431) 63° 24′ N, 53° 10′ W, 892 m, trawl, 9—6—1909, 2 spec.
(St. 337) 64° 05′ N, 52° 20′ W, 1100 m., trawl, 8—5—1909, 1 spec.
(St. 407—08) 64° 14′ N, 55° 55′ W, 839 m, clay, trawl, 2—6—1909, 10 spec.
(St. 125) 69° 17′ N, 52° 14′ W, 550 m wire, 16—7—1908, many spec. (100 cm^3).
(St. 171) 70° 41′ N, 52° 07′ W, 386 fath., 800 m wire, 6—8—1908, many spec. (100 cm^3).

32. **Boreomysis microps** G. O. Sars.

Boreomysis microps G. O. Sars, Forh. Vid. Selsk. Christiania for 1883. No. 7, p. 35.

**Boreomysis nobilis* G. O. Sars, Challenger-Report, Zool., vol. 13, pt. 37, 1885, p. 185, Pl. 33, fig. 7—10.
— *subpellucida* H. J. Hansen, Bull. Mus. Océanogr., Monaco, No. 30, 1905, p. 8, fig. 5—8.
— *microps*, Zimmer, Fauna arctica, vol. 3, 1904, p. 431.
— — — Nordisches Plankton. vol. 6, 1909, p. 55, fig. 79—82.
— — H. J. Hansen, Ingolf 1908. p. 103.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 7 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909, 10 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 20 spec.
(St. 338) 64° 01′ N, 55° 30′ W. 1185 m., 1400—1500 m. wire, 8—5—1909, 20 spec.
(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire. 8—5—1909, 25 spec.
(St. 346) 64° 22′ N, 56° 00′ W, 800—400 m. wire, 10—5—1909, 25 spec.
(St. 348) 64° 35′ N, 56° 18′ W, 900 m. wire, 11—5—1909, ca. 20 spec.

New to W. Greenland.

33. **Longithorax fuscus** H. J. Hansen.

**Longithorax fuscus* H. J. Hansen, Ingolf 1908, p. 103, Pl. 5, fig. 1.
— — Zimmer, Nordisches Plankton vol. 6, 1909, p. 125, fig. 240—43.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909. 1 spec. (♀,17 mm., very imperfect).

New to Greenland. — Only 4 specimens of this species are known, viz, besides the specimen from the "Tjalfe", 3 from the following localities: 61° 30' N, 17° 08' W, 1800 m. wire (S. of Iceland) (H. J. Hansen "Ingolf"), 49° 27' N, 13° 33' W, 2600 m., 2800 m. wire (H. J. Hansen, ibid.), and 50° 59' W, 11° 52' W, 900—1064 fms., temp. 15,4° C. (W. of Ireland) (Tattersall, Fisheries, Ireland, Sci. Invest., 1911 p. 52).

34. **Meterythrops robusta** S. I. Smith.

Meterythrops robusta S. I. Smith, Transact. Conn. Acad, vol. 5, 1879, p. 93, Pl. 12, fig. 1—2.
**Parerythrops* — G. O. Sars, Monografi Norges Mysider, III, 1879, p. 98, Pl. 39.
— — Zimmer, Fauna arctica, vol. 3, 1904, p. 445.

Meterythrops robusta Zimmer, Nordisches Plankton. vol. 6, 1909, p. 85, fig. 168—72.
— — H. J. Hansen, Ingolf 1908, p. 106.
non — — Holt & Tattersall, Rep. Sea and Inland Fisheries, 1902—03 (1903), pt. 2, App. No. 4 (is *Parerythrops obesa*, see H. J. Hansen l. c., p. 107, *Meterythrops robusta*).

(St. 196 d) 68° 40′ N, 53° 12′ W, 410 m., 350 m. wire, 17—8—1908, 1 spec.

35. **Mysis oculata** O. Fabr.

Cancer oculatus O. Fabricius, Fauna Groenlandica, 1780, p. 245.
— — — Kgl. Danske Vid. Selsk. Skrifter, Ny Samling, vol. 1, 1781, p. 565, fig. 2.
Mysis oculata Krøyer in Gaimard, Voyage en Scandinavie, Crust., 1846 (1849?) Pl. 8, fig. 2—3.
— — — Naturhist., Tidsskrift, 3. Række, vol. 1, 1861, p. 13.
* — -- G. O. Sars, Monografi Norges Mysider, III, 1879, p. 69, Pl. 31.
— — Zimmer, Fauna arctica, vol. 3, 1904, p. 461.
— — — Nordisches Plankton, vol. 6, 1909, p. 160, fig. 348—54.
— — H. J. Hansen, Ingolf, 1908, p. 114.
— — — V. Grønland 1887, p. 214.

Vaskebugten close by Ritenbenk, from the stomach of Gadus callarias, 29—7—1908, many spec. (ca. 15 cm.[3]).

Cumacea.

36. **Diastylis Goodsirii Bell.**

Alauna Goodsirii Bell, in Belcher, Last of the arctic voyages, vol. 2, 1855, p. 403, Pl. 34, fig. 2.
**Diastylis* — H. J. Hansen, Dijmphna—Togtets zool.-botan. Udbytte, 1887, p. 241, Pl. 22, fig. 5, Pl. 23, fig. 1.
— — Zimmer, Fauna arctica, vol. 1, 1900, p. 422.
* — — G. O. Sars, Account, vol. 3, Cumac., 1900, p. 54, Pl. 41.
— — H. J. Hansen, V. Grønland 1887, p. 206.

(St. 369) 66° 45′ N, 56° 30′ W, ca. 200 fath., trawl, 20—5—1909, ca. 20 spec.

37. **Diastylis spinulosa** Heller.

Diastylis spinulosa Heller, Denkschr. d. K. Akad. d. Wiss., Wien, Math. naturwiss. Cl., vol. 35, 1878, p. 28, Pl. 1, fig. 5.
— — Hoeck, Niederl. Arch. f. Zool., Supplbd. 1, 1882, p. 25.
— *nodosa* G. O. Sars, Norske Nordhavs-Exp., Crust. 1885, p. 61, Pl. 7, fig. 1—4.

**Diastylis spinulosa* G. O. Sars, Account vol. 3, Cumac., 1900, p. 55, Pl. 42.
— — Zimmer, Fauna arctica vol. 1, 1900, p. 225.
— — H. J. Hansen, V. Grønland 1887, p. 205.

(St. 369) 66° 45′ N, 56° 30′ W, ca. 200 fath., trawl, 20—5—1909, 4 spec.

Amphipoda.

38. **Scina sp.**

(St. 338) 64° 01′ N, 55° 30′ W, 1185 m., 1400—1500 m. wire, 8—5—1909, 1 spec., very imperfect.

The genus is new to Greenland.

Genus Lanceola.

Key to the species: Stebbing in Biscayan Plankton, part 2, Amphip. & Cladocera, Transact. Linn. Soc., London, 1904, ser. 2, Zool., vol. 10, part. 2, p. 29.

39. **Lanceola serrata** Bovallius.

Lanceola serrata Bovallius. On some forgotten genera among Amphip. Crust., Bihang Kgl. Svenska Vet. Akad. Handl. vol. 10, 1885, No. 14, p. 7.
— — — Arctic and Antarctic Hyperids, Vega-Expeditionens vet. Iaktt., vol. 4, 1887, p. 554.
* — — — Amphip. Hyper, part I, 1. Kgl. Svenska Vet. Akad. Handl., vol. 21, 1887, No. 5, p. 34, Pl 5, fig. 2—13.

(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 1 spec.
(St. 344) 64° 22′ N, 55° 48′ W, 1040 m., 1200 m. wire, 10—5—1909, 1 spec.

? 40. **Lanceola Sayana** Bovallius.

Lanceola Sayana Bovallius, On some forgotten genera among the Amph. Crust., Bihang Kgl. Svenska Vet. Akad. Handl., vol. 10, 1885, No. 14, p. 7, Pl. 1, fig. 1.
* — — Bovallius, Kgl. Svenska Vet. Akad. Handl., vol. 21, No. 5, 1887, p. 30, Pl. 4, Pl. 5, fig. 1.
— — Chevreux, Amphip. de l'»Hirondelle«, Rés. Camp. Sci. fasc. 16, Monaco, 1900, p. 134, Pl. 14, fig. 10 (Coloured fig.).
— — Vosseler, Amphip. d. Plankton-Exp. I, Hyperiiden 1. Mitt. Kønigl. Natur-Kabinet, Stuttgart, No. 17, 1901, p. 127.

Lanceola sayana Stebbing, Biscayan Plankton, Amphip. and Cladoc. Transact. Linn. Soc. London, Zool., vol. 10, pt. 2, 1904, p. 29—30.

(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909. 1 spec.

I am not quite sure that the determination is right, the specimen being somewhat imperfect; but, if it is, as I believe, *L. Sayana*, the species is new to Greenland.

Lanceola sp.

(St. 1b) 59° 25′ N, 22° 56′ W, surflace, 12—5—1908, 2 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909. 1 spec.

I have not been able to determine these 3 specimens, partly because they seem to me to be not full-grown, partly because they are somewhat imperfect.

41. **Hyperia medusarum** O. Fr. Müller.

Cancer medusarum O. Fr. Müller, Zool. Dan. Prodromus, 1776, No. 2355, p. 196.
Hyperia spinipes Boeck, Skandinav. og Arkt. Amphip, 1873—76, p. 81, Pl. 2, fig. 2.
— *medusarum* Bovallius, Arctic and Antarctic Hyperids, Vega-Expeditionens vetenskap. Iaktt. vol. 4, 1887, p. 560, Pl. 42, fig. 26—33.
* — — G. O. Sars, Account, vol. 1, Amphip., 1895, p. 7, Pl. 3, fig. 2.
— — H. J. Hansen, V. Grønland 1887, p. 86.

(St. 11) 57° 41′ N, 35° 28′ W, surflace, 20—5—1908, 2 spec.
(St. 285) 57° 51′ N, 43° 48′ W, 1000 m. wire, 29—9—1908, 1 spec.
(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, 3 spec.
(St. 6) 58° 24′ N, 34° 53′ W, surflace, 16—5—1908, 3 spec.
(St. 312) 58° 38′ N. 46° 13′ W, pelagic townet, 29—4—1909, 1 spec.
(St. 313) — — surflace — 1 spec.
(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, 5 spec.
(St. 19b) 58° 41′ N, 49° 44′ W, 200 m. wire, 31—5—1908, 1 spec.
(St. 1a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, 3 spec.
(St. 1b) — — surflace — 2 spec.
(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 1 spec.
(St. 270) 62° 21′ N, 51° 31′ W, 84 fath., 80 m. wire, 24—9—1908, 1 spec.
(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6—5—1909, 4 spec.

(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1500—1200 m. wire, 9—6—1909, 1 spec.
(St. 423) 65° 03′ N, 54° 16′ W, 80, 100, 120 m. wire, 7—6—1909, 1 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 4 spec.
(St. 30b) — — 70 m. wire — 1 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1000 m. wire, 23—6—1908, 1 spec.

From the literature we cannot see, if the species hitherto has been taken at W. Greenland; in V. Grønland 1887 H. J. Hansen mentions it from Greenland without special locality, and Bovallius (l. c.) mentions it but from "coasts of Greenland".

42. **Hyperoche Krøyeri** Bovallius.

Metoecus Medusarum Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. math.-naturvid. Afhandl., vol. 7, 1838, p. 288, Pl. 3, fig. 15.
Tauria — Boeck, Skand. og Arktiske Amphipoder, 1873—76, p. 82.
Hyperoche Krøyeri + *H. Lütkenii* Bovallius, Arct. and Antarct. Hyperids, Vega-Expeditionens vet. Iaktt., vol. 4, 1887, p. 564, p. 565, Pl. 44, fig. 63-71.
* — *Krøyeri* G. O. Sars, Account, vol. 1, Amphip, 1895, p. 9, Pl. 4.
— *medusarum* H. J. Hansen, V. Grønland 1887, p. 58.

(St. 11) 57° 41′ N, 35° 28′ W, surflace, 20—5—1908, 2 spec.
(St. 23) 58° 01′ N, 51° 36′ W, surflace, 1—6—1908, 1 spec.
(St. 6) 58° 24′ N, 34° 53′ W, surflace, 16—5—1908, 3 spec.
(St. 292) 58° 24′ N, 30° 35′ W, 500 m. wire, 3—10—1908, 3 spec.
(St. 7) 58° 33′ N, 35° 49′ W, 150 m. wire, 17—5—1908, 1 spec.
(St. 1b) 59° 25′ N, 22° 56′ W, surflace, 12—5—1908, 9 spec.
(St. 270) 62° 21′ N, 51° 31′ W, 84 fath, 80 m. wire, 24—9—1908, 2 spec.
(St. 229) 64° 20′ N, 53° 03′ W, 80—120 m. wire, 29—8—1908, 7 spec.
(St. 405) 64° 25′ N, 56° 12′ W, 100 m. wire, 2—6—1909, 1 spec.

43. **Parathemisto oblivia** Kr.

Hyperia oblivia Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. naturvid.-math. Afh., vol. 7, 1838, p. 296, Pl. 4, fig. 10.
Parathemisto abyssorum Boeck, Crust. Amphip. boreal. et arct., Vid. Selsk. Forh. Christiania, 1870, p. 86.
— *oblivia* G. O. Sars, Oversigt af Norges Crust., ibid., 1882, Nr. 18, p. 10, Pl. 5, fig. 1.
**Parathemisto oblivia* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 10, Pl. 5, fig. 1.
— *abyssorum* + *Hyperia Latreillei* (partim) H. J. Hansen, V. Grønland 1887, p. 59, 56.

(St. 10) 57° 37′ N, 35° 17′ W, surflace, 20—5—1908, 3 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, 1 spec.
(St. 30a) 63° 04 N, 56° 32′ W, 500 m. wire, 7—6—1908, 1 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1000 m. wire, 23—6—1908, 1 spec.
(St. 196d) 68° 40′ N, 53° 12′ W, 410 m., 350 m. wire, 17—8—1908, 1 spec.
(St. 125) 69° 17′ N, 52° 14′ W, 550 m. wire, 16—7—1 90 many spec. (5 cm.³)
(St. 171) 70° 41′ N, 52° 07′ W. 386 fath., 800 m. wire, 6—8—1908, 15 spec.
(St. 172) 70° 42′ N, 52° 14′ W, 450 m.wire, 6—8—1908, many spec. (5 cm.³).

44. **Euthemisto compressa** Goës.

Themisto compressa Goës, Crust. Amphip. Spetsberg., Kgl. Svenska Vet. Akad. Forh., 1866, No. 8, p. 533, Pl.41, fig. 34.
Parathemisto — Boeck, Crust. Amphip. boreal. et arctca, Vid. Selsk., Forh., Christiania 1870, p. 7.
**Euthemisto* — G. O. Sars, Account, vol. 1, Amphip., 1895, p. 12, Pl. 5, fig. 2.
(partim) — — H. J. Hansen, V. Grønland 1887, p. 59 (confounded with *E. bispinosa* Boeck).

(St. 10) 57° 37′ N, 35° 17′ W, surflace, 20—5—1908, 10 spec.
(St. 11) 57° 41′ N, 35° 28′ W, surflace, 20—5—1908, manyspec. (25 cm.³).
(St. 281) 57° 51′ N, 43° 57′ W, 500 m. wire, 29—9—1908, many spec. (20 cm.³).
(St. 285) 57° 51′ N, 43° 48′ W, 1000 m. wire, 29—9—1908, many spec. (25 cm.³)
(St. 286) 57° 59′ N, 41° 21′ W. 80—200 m. wire, 30—9—1908, many spec. (25 cm.³).
(St. 23) 58° 01′ N, 51° 36′ W, surflace, 1—6—1908, 9 spec.
(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, many spec. (25 cm.³)
(St. 278) 58° 16′ N, 47° 12′ W, 80—200 m. wire, 28—9—1908, many spec (10 cm.³).
(St. 308) 58° 20′ N, 41° 12′ W, 1000 m. wire, 28—4—1909, 8 spec.
(St. 5) 58° 23′ N, 34° 41′ W, surflace, 16—5—1908, 10 spec.
(St. 6) 58° 24′ N, 34° 53′ W, surflace, 16—5—1908, many spec. (20 cm.³).
(St. 292) 58° 24′ N, 30° 35′ W, 500 m. wire, 3—10—1908, many spec. (5 cm.³).
(St. 4) 58° 27′ N, 33° 03′ W, surflace, 15—5—1908, 10 spec.
(St. 25) 58° 32′ N, 51° 11′ W, surflace, 2—6—1908, 1 spec.
(St. 9) 58° 33′ N, 35° 55′ W, 600 m. wire, 17—5—1908, , spec.
(St. 312) 58° 38′ N, 46° 13′ W, pelagic townet, 29—4—1909 1 spec.
(St. 313) — — surflace, — 3 spec.
(St. 2) 58° 40′ N, 30° 40′ W, surflace, 14—5—1908, many spec. (10 cm.³).
(St. 19b) 58° 41′ N, 49° 44′ W, 200 m. wire, 31—5—1908. 2 spec.
(St. 316) 58° 59′ N, 50° 28′ W, 500 m. wire, 1—5—1909, many spec. (5 cm.³).

(St. 1a) 59° 25′ N, 22° 56′ W, 175 m. wire, 12—5—1908, many spec. (10 cm.³).
(St. 1b) — — surflace, — — —
(St. 303) 59° 28′ N, 33° 05′ W, pelagic townet, 26—4—1909, 8 spec.
(St. 298) 59° 41′ N, 25° 02′ W, 500 m. wire, 6—10—1908, 3 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, 15 spec.
(St. 322) — — 2000 m. wire, — 2 spec.
(St. 301) 60° 10′ N, 28° 13′ W, pelagic townet, 25—4—1909, 3 spec.
(St. 326) 62° 05′ N, 53° 41′ W, 100 m. wire, 6—5—1909, 2 spec.
(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6—5—1909, 12 spec.
(St. 330) — — surflace, — 2 spec.
(St. 29) 62° 45′ N, 57° 11′ W, surflace, 7—6—1908, 2 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, many spec. (25 cm.³).
(St. 30b) — — 70 m. wire, — — —
(St. 31a) 63° 11′ N, 56° 23′ W, pelagic townet, 7—6—1908, 1 spec.
(St. 33b) 63° 25′ N, 54° 34′ W, 200 m. wire, 8—6—1908, 6 spec.
(St. 37b) 63° 47′ N, 52° 12′ W, 100 m. wire, 9—6—1908, 1 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1000 m. wire, 23—6—1908, 7 spec.
(St. 229) 64° 20′ N, 53° 03′ W, 80—120 m. wire, 29—8—1908, many spec. (10 cm.³).
(St. 423) 65° 03′ N, 54° 16 W, 80, 100, 120 m. wire, 7—6—1909, 1 spec.

45. **Euthemisto bispinosa** Boeck.

Themisto bispinosa Boeck, Crust. Amphip. boreal. et arctica, Vid. Selsk. Forh., Christiania, 1870, p. 8.
**Euthemisto* — G. O. Sars, Account, vol. 2, Amphip., 1895, p. 14, Pl. 6, fig. 2.
(partim) — *compressa* H. J. Hansen, V. Grønland 1887, p. 59 (*E. bispinosa* Boeck and *E. compressa* Goës are confounded).

(St. 23) 58° 01′ N, 51° 36′ W, surflace, 1—6—1908, many spec. (12 cm.³).
(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, many spec. (7 cm.³).
(St. 278) 58° 16′ N, 47° 12′ W, 80—200 m. wire, 28—9—1908, 2 spec.
(St. 308) 58° 20′ N, 41° 12′ W, 1000 m. wire, 28—4—1909, 2 spec.
(St. 25) 58° 32′ N, 51° 11′ W, surflace, 2—6—1908, 5 spec.
(St. 313) 58° 38′ N, 46° 13′ W, 29—4—1909, 6 spec.
(St. 19a) 58° 41′ N, 49° 44′ W, 100 m. wire, 31—5—1908, 4 spec.
(St. 19b) — — 200 m. wire, — —
(St. 316) 58° 59′ N, 50° 28′ W, 500 m. wire, 1—5—1909, 9 spec.
(St. 276) 59° 18′ N, 51° 00′ W, 80 m. wire, 27—9—1908, many spec. (15 cm.³).
(St. 298) 59° 41′ N, 25° 02′ W, 500 m. wire, 6—10—1908, 3 spec.
(St. 270) 62° 21′ N, 51° 31′ W, 84 fath., 80 m. wire, 24—9—1908, many spec. (5 cm.³).

(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6—5—1909, 3 spec.
(St. 330) 62° 36′ N, 54° 12′ W, surflace, 6—5—1909, 3 spec.
(St. 29) 62° 45′ N, 57° 11′ W, surflace, 7—6—1908, 10 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, many spec. (30 cm.^{3}).
(St. 30b) — — 70 m. wire, — 2 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1000 m. wire, 23—6—1908, 1 spec.
(St. 229) 64° 20′ N, 53° 03′ W, 80—120 m. wire, 29—8—1908, 8 spec.

46. **Euthemisto libellula** Mandt.

Gammarus Libellula Mandt, Observat. in hist. nat. et anat. compar. in itinere Groenl. factæ, 1822, p. 32.
Themisto arctica + *T. crassicornis* Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. naturv. math. Afh., vol. 7, 1838, p. 291, Pl. 4, fig. 16, p. 295, Pl. 4, fig. 17.
— *libellula* Boeck, Skand. og Arkt. Amphip., 1873—76, p. 88.
Euthemisto — + *E. Nordenskiöldii* Bovallius, Arct. and. Antarct. Hyp., Vega Exp. vet. Iaktt., vol. 4, 1887, p. 569, Pl. 46, fig. 90—96, p. 570, Pl. 47, fig. 104—10.
* — — G. O. Sars, Account, vol. 1, Amphip., 1895, p. 13, Pl. 6, fig. 1.
— — H. J. Hansen, V. Grønland 1887, p. 60.

(St. 25) 59° 32′ N, 51° 11′ W, surflace, 2—6—1908, 5 spec.
(St. 7) 58° 33′ N, 35° 49′ W, 150 m. wire, 17—5—1908, 1 spec.
(St. 312) 58° 38′ N, 46° 13′ W, pelagic townet, 29—4—1909, 1 spec.
(St. 321) 60° 07′ N, 48° 26′ W, 600 m. wire, 3—5—1909, 2 spec.
The channel at Nanortalik, from stomachs of Gadus, 6—9—1909, 7 spec.
(St. 521) 61° 42′ N, 49° 46′ W, 260 m., 100 m. wire, 9—7—1909, 15 spec.
(St. 329) 62° 36′ N, 54° 12′ W, pelagic townet, 6—5—1909, many, very little spec. (1 cm.^{3}).
(St. 29) 62° 45′ N, 57° 11′ W, 7—6—1908, 10 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 2 spec.
(St. 30b) — — 70 m. wire, — 8 spec.
(St. 31a / St. 31c) 63° 11′ N, 56° 23′ W, pelagic townet, 7—6—1908, 5 spec.
(St. 37b) 63° 47′ N, 52° 12′ W, 100 m. wire, 9—6—1908, 4 spec.
(St. 76) 63° 49′ N, 53° 27′ W, 1300 m., 1000 m. wire, 23—6—1908, 1 spec.
(St. 69) 63° 53′ N, 53° 28′ W, 600 m., surface, 22—6—1908, many spec. (3 cm.^{3}).
(St. 405) 64° 25′ N, 56° 12′ W, 100 m. wire, 2—6—1909, many, very little spec. (1 cm.^{3}).
(St. 423) 65° 03′ N, 54° 16′ W, 80—100—120 m. wire, 7—6—1909, many spec. (15 cm.^{3}).
(St. 196d) 68° 40′ N, 53° 12′ W, 410 m., 350 m. wire, 17—8—1908, many spec. (150 cm.^{3}).
(St. 125) 69° 17′ N, 52° 14′ W, 550 m. wire, 16—7—1908, many spec. (75 cm.^{3}).

(St. 124) 69° 17′ N, 52° 14′ W, 150 m. wire, 16.—7.—1908, many spec. (5 cm.[3]).
(St. 171) 70° 41′ N, 52° 07′ W, 386 fath., 800 m. wire, 6—8—1908, many spec. (10 cm.[3]).
(St. 172) 70° 42′ N, 52° 14′ W, 450 m. wire, 6—8—1908, many spec. (15 cm.[3]).

In "V. Grønland" 1887 H. J. Hansen mentions the species only from 5 localities (ca. 64°—77° 40' N).

47. **Socarnes Vahlii** Kr.

Lysianassa Vahlii Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. naturvid. math. Afh., vol. 7, 1838, p. 233.
Anonyx — — in Gaimard: Voyage en Scand., Crust. 1846 (1849?) Pl. 14, fig. 1.
**Socarnes* — G. O. Sars, Account, vol. 1, Amphip., p. 45, Pl. 16, fig. 2.
— — Stebbing, Tierreich, p. 57 (ubi litt.).
— — H. J. Hansen, V. Grønland 1887, p. 62.

St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 80 m. wire, 21—6—1909, 2 spec.

48. **Hippomedon abyssi** Goës.

**Lysianassa abyssi* Goës, Crust. Amphip. Spetsberg., Öfvers. Akad. Förhandl., vol. 22, 1866, p. 519, Pl. 37, fig. 5.
Paratryphosites — Stebbing, Tierreich, p. 43 (ubi litt.).
Hippomedon — H. J. Hansen, V. Grønland 1887, p. 66.

St. 118) 69° 17′ N, 52° 50′ W, clay-bottom, ca. 225 fath., trawl., 15—7—1908, 7 spec.

49. **Cyphocaris anonyx** Boeck.

Cyphocaris anonyx Boeck, Crust. Amphip. boreal. et arctica, Forh. Vid. Selsk., Christiania, 1870, p. 104.
— — — Skand. og arkt. Amphip., 1873—76, p. 141, Pl 6, fig. 1.
* — *micronyx* Stebbing, Challenger Report, vol. 29, 1888, p. 656, Pl. 16.
— — Chevreux, Amphip. . . . del'Hirondelle, Result. Camp. sc., fasc. 14, Monaco 1900, p. 164, Pl. 14, fig. 11 (coloured fig.).
— *anonyx* Stebbing, Tierreich, p. 29.
— — H. J. Hansen, V. Grønland 1887, p. 66.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 5 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1200—1500 m. wire, 9—6—1909, 2 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 1 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 2 spec.
(St. 338) 64° 01′ N, 55° 30′ W, 1185 m., 1400—1500 m. wire, 8—5—1909, 2 spec.

(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 2 spec.
(St. 346) 64° 22′ N, 56° 00′ W, 400—800 m. wire, 10—5—1909, 2 spec.
(St. 348) 64° 35′ N, 56° 18′ W, 900 m. wire, 11—5—1909, 1 spec.

New to W. Greenland. In V. Grønland 1887 H. J. Hansen mentions the species from 30 miles S. O. to Cap Farewell, 300 fath., but not from W. Greenland.

50. **Metacyphocaris Helgæ** Tattersall.

Metacyphocaris Helgæ Tattersall, Pelagic Amphipoda of the Irish Atlantic slope. Fisheries, Ireland, Sci. Invest., 1905, pt. IV (1906), p. 29, Pl. 3, fig. 1, Pl. 4, fig. 1—14.

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 6 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1530 m. wire, 1300 m., 7—5—1909, 5 spec.
(St. 338) 64° 01′ N, 55° 30′ W, 1185 m., 1400—1500 m. wire, 8—5—1909, 2 spec.

New to Greenland. Tattersall (l. c.) mentions 17 spec. from 4 localities at W. Ireland.

51. **Aristias tumidus** Kr.

Anonyx tumidus Kröyer, in Gaimard, Voyage en Scand., Crust., 1846 (1849?) Pl. 16, fig. 2.
— — — Karcin. Bidrag, Naturhist. Tidsskrift, Ny Række, vol. 2, 1846, p. 16, 40.
**Aristias* — G. O. Sars, Account, vol. 1, Amphip, 1895, p. 49, Pl. 18, fig. 1.
— — Stebbing, Tierreich, p. 49 (ubi litt.)
— — H. J. Hansen, V. Grönland 1887, p. 67.
non *Aristias tumidus* Bruzelius, Kgl. Svenska Vet.-Akad. Handl., n. ser., vol. 3, 1859, no. 1, p. 41.

(St. 465) 62° 58′ N, 50° 52′ W, ca. 25 fath., 21—6—1909, 1 spec.

52. **Alibrotus littoralis** Kr.

Anonyx littoralis Kröyer, in Gaimard: Voyage en Scand., Crust., 1846 (1849?) Pl. 13, fig. 1.
— *litoralis* Kröyer, Karcin. Bidrag, Naturh. Tidsskrift, Ny Række, vol. 1, 1845, p. 621; vol. 2, 1846, p. 36.
**Alibrotus littoralis* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 102 Pl. 35, fig. 2.
Pseudalibratus litoralis Stebbing, Tierreich, p. 33.
Onisimus — H. J. Hansen, V. Grönland, 1887, p. 73.

Kangerdluarsuk (61° 50′ N), from stomachs of herrings, 28—6—1909, many spec. (15 cm.[3]).

53. **Katius obesus** Chevreux.

**Katius obesus* Chevreux, Description d'un Amphipode (Katius obesus nov. gen. et sp.) Bull. Mus. Océanogr., Monaco, No. 35, 1905 (with figs.)
— — Tattersall, Pelagic Amphipoda of the Irish Atlantic slope, Fisheries, Ireland, Sci. invest., 1905, pt. 4 (1906), p. 29.

(St. 15) 58° 08′ N, 39° 24′ W, 500 m. wire, 26—5—1908, 22 spec.
(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1905, 2 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1600 m., 1200—1500 m. wire, 9—6—1909, 7 spec.
(St. 333) 63° 18′ N, 54° 55′ W, 1300 m., 1530 m. wire, 7—5—1909, 2 spec.
(St. 338) 64° 01′ N, 55° 30′ W, 1185 m., 1400—1500 m. wire, 8—5—1909, 1 spec.
(St. 410) 64° 14′ N, 55° 55′ W, 839 m., trawl, 3—6—1909, 1 spec.

New to Greenland.

Most of the specimens from the "Tjalfe" measure 25 mm. (the specimen of Chevreux is 12 mm.), and where the colour is preserved it is bright scarlet. Hitherto but two specimens of the species were known, viz., from 36° 17′ N, 28° 53′ W, 3410 m., 0—3000 m. wire 1 spec. (Chevreux l. c.,), and 50 miles N. to W. of Eagle Island, Co. Mayo, 1200 fath., 1 spec. (Tattersall l. c.).

54. **Pontoporeia femorata** Kr.

Pontoporeia femorata Kröyer, Nye nordiske Sl. og Arter af Amfip., Naturh. Tidsskrift, vol. 4, 1842, p. 153.
— — — in Gaimard, Voyage en Scand., Crust., 1846 (1849?) Pl. 23, fig. 2.
* — — G. O. Sars, Account, vol. 1, Amphip. 1895, p. 123, Pl. 41, fig. 1.
— — Stebbing, Tierreich, p. 128 (ubi. litt.)
— — H. J. Hansen, V. Grønland 1887, p. 80.

(St. 118) 69° 17′ N, 52° 50′ W, clay-bottom, ca. 225 fath., trawl, 15—7—1908, 1 spec.

55. **Stegocephalus inflatus** Kr.

Stegocephalus inflatus Kröyer, Nye nordiske Sl. og Arter af Amfip., Naturh. Tidsskrift, vol 4, 1842, p. 150.
— — Kröyer, in Gaimard, Voyage en Scand., Crust., 1846 (1849?) Pl. 20, fig. 2.
* — — G. O. Sars, Account, vol. 1, Amphip, 1895, p. 198, Pl. 69.

Stegocephalus inflatus Stebbing, Tierreich, p. 91 (ubi litt.)
— — H. J. Hansen, V. Grønland 1887, p. 87.

(St. 397) 66° 42′ N, 56° 12′ W, 130 fath., trawl, 31—5—109, 1 spec.
(St. 370) 66° 45′ N, 56° 23′ W, ca. 175 fath., trawl, 20—5—1909, 1 spec.
(St. 177) 70° 42′ N, 54° 48′ W, 253 fath., trawl, 7—8—1908, 1 spec.

The spec. from St. 397 is 37 mm., the two other are but a little smaller.

56. **Metopa pollexiana** Sp. Bate.

Montagua pollexiana Sp. Bate, Rep. Brit. Ass. f. the Adv. of Sc., 1855, p. 57 (nomen nudum).
**Metopa* — G. O. Sars, Account, vol. 1, Amphip., 1895, p. 269, Pl. 95.
— *norvegica* Stebbing, Tierreich, p. 177 (ubi litt).
— *pollexiana* H. J. Hansen, V. Grönland 1887, p. 92, Pl. 3, fig. 5.

(St. 52) Kugssukfjord (Godthaabsfjord), 156 fath., trawl, 15—6—1608, ca. 25 spec.

57. **Cleonardo microdactylus** n. sp. (fig. 3—4).

(St. 336) 64° 06′ N, 55° 18′ W, 1040—1100 m., 1200 m. wire, 8—5—1909, 2 spec., ♀.

Upon the whole we know 6 species of the genus *Cleonardo*, viz. *C.* (*Tritropis*) *appendiculatus* G. O. Sars (Norske Nordhavs-Exp. Crust. I, 1885, p. 194, Pl. 16, fig. 3), *C. longipes* Stebbing (Challenger Report, Zool., vol. 29, p. 959, Pl. 86), *C. Neuvillei*, *C. longirostris*, *C. spinicornis* and *C. biscayensis* Chevreux (Bull. Inst. Océanogr. Monaco, No. 121, 1908, p. 1—12 (all the four species), fig. 1—6). Knowledge of the species is very defective, for they are bathypelagic and known in but single specimens; of most of the species we know but one sex.

As I have given figs. of all the appendages (except the pleopoda) I shall give but a very short description.

Length 7 mm.

♂ unknown. — ♀: The head with rostrum a little shorter than the first segment; this is somewhat longer than the following ones. The eyes are distinct, rather large and uncoloured. The sideplates 1—4 rounded below. Pereion is inflated, the back rounded

and the segments 1—2 have a distinct, but low dorsal carina as in *C. appendiculatus*; the postero-lateral corners on these 3 segments acutely produced. Telson has about the same form as in the other species (unknown in *C. appendiculatus*). The antennæ

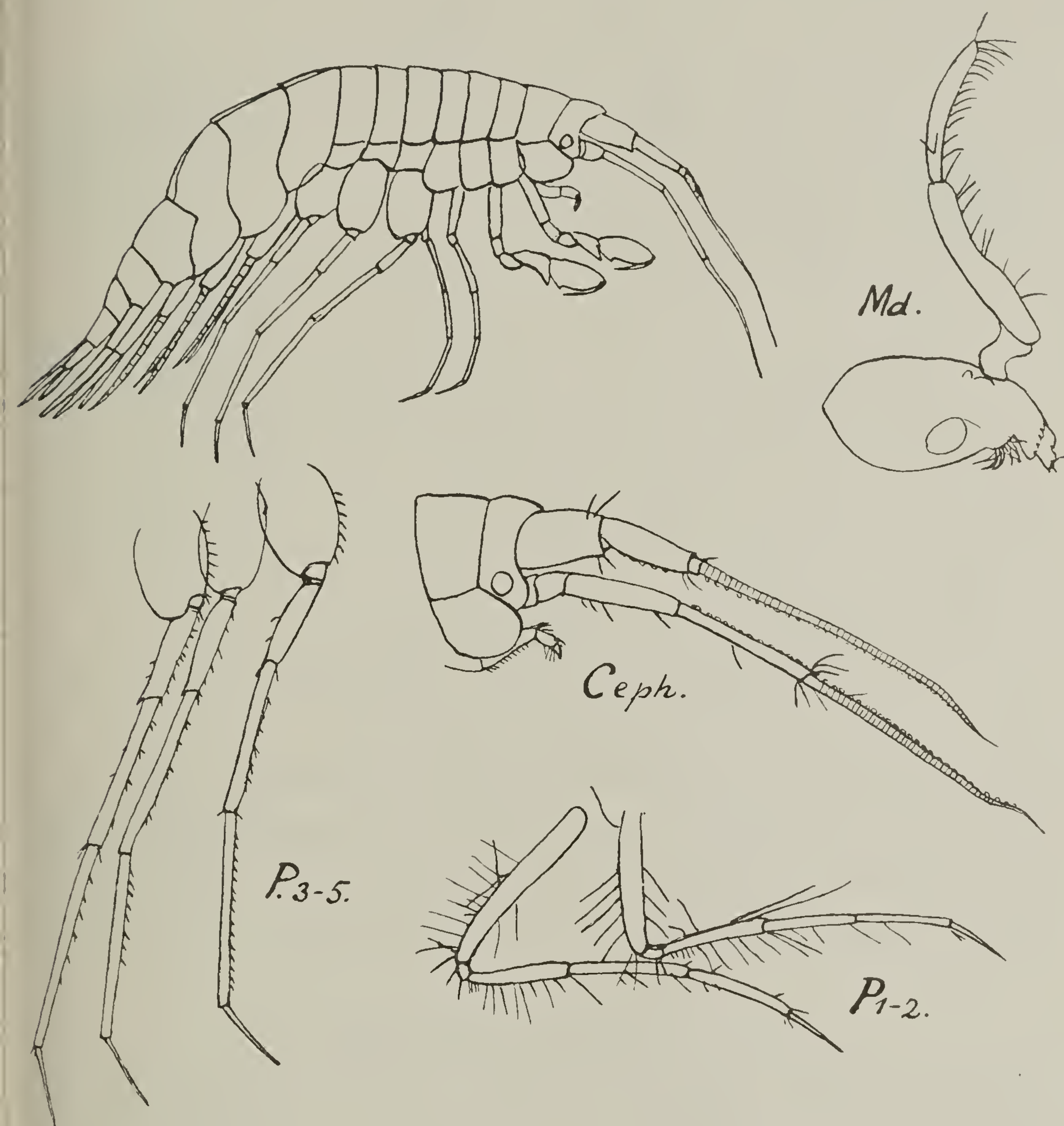


Fig. 3. *Cleonardo microdactylus.*

are about half as long as the body; ant. 1 a little shorter than ant. 2. In antenna 1 the first joint is stout about as in *C. longipes*; the second joint is of equal length, but much narrower; the third very short. In antenna 2 the ultimate joint in the peduncle is a little shorter and narrower than the penultimate; flagellum

a little shorter than the peduncle. The form of the oral parts may be seen from the figs. In the two gnathopoda the 5th joint has about the same form as in *C. longipes*. Pereiopoda 1—5 have the usual form, but in p. 3—5 the dactylus is not half as long

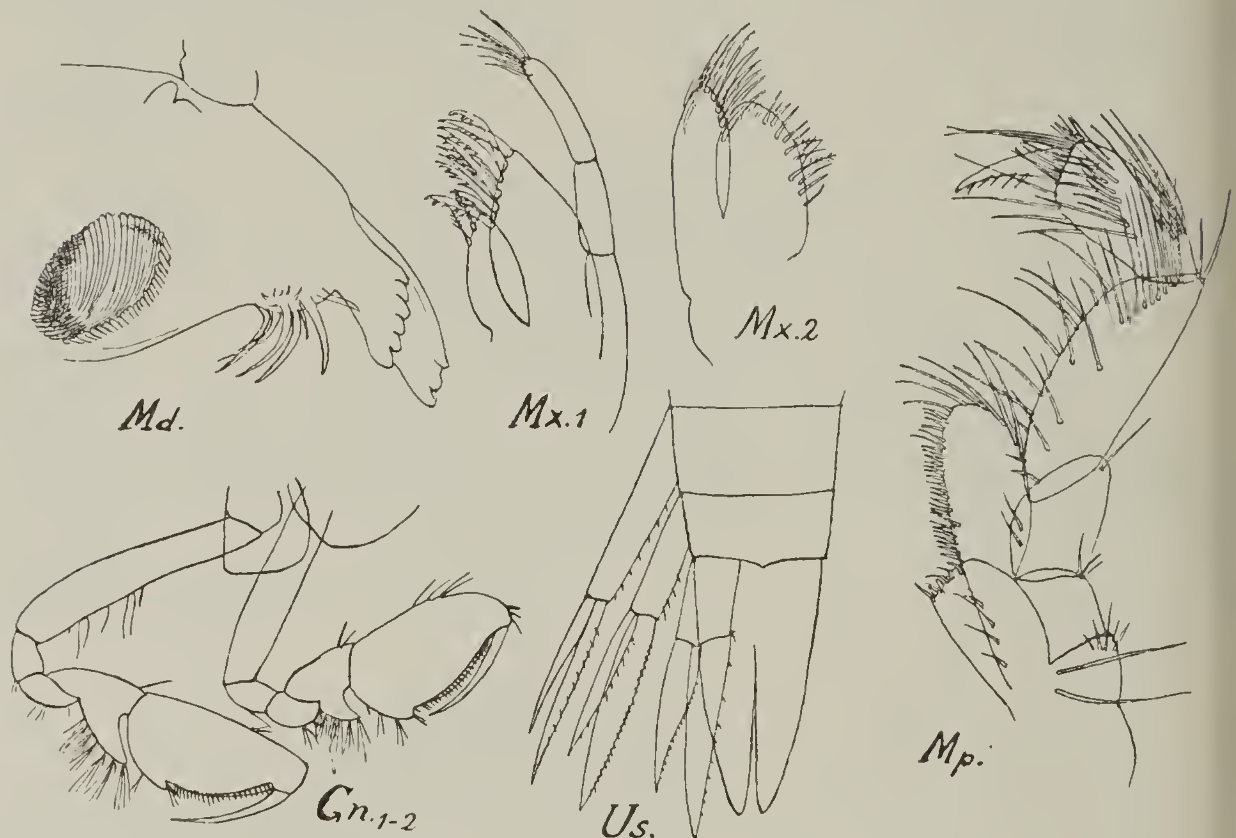


Fig. 4. *Cleonardo microdactylus.*

as the 6th joint; in the other species the dactylus always is at least half as long as the 6th joint, in some of the specimens somewhat longer. The pleopoda have the usual form. The form and length of the uropoda may be seen from the fig.

58. **Paramphithoë pulchella** Kr.

Amphitoe pulchella Krøyer, in Gaimard, Voyage en Scand., Crust. 1846 (1849?) Pl. 10, fig. 2.

**Paramphithoe pulchella* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 346, Pl. 122, fig. 1.

Neopleustes pulchellus Stebbing, Tierreich, p. 312 (ubi litt.).

Paramphithoe pulchella H. J. Hansen, V. Grønland 1887, p. 119, Pl. 5, fig. 2.

(St. 40c) 63° 48′ N, 52° 23′ W, 194 m., trawl, 10—6—1908, 1 spec.

59. **Paramphithoë bicuspis** Kr.

Amphithoe bicuspis Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. math. naturvid. Afh., vol. 7, 1838, p. 273, Pl. 2, fig. 10.

**Paramphitoe bicuspis* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 349, Pl. 123, fig. 1.
Neopleustes — Stebbing, Tierreich, p. 313 (ubi litt.).
Paramphithoe — H. J. Hansen, V. Grønland 1887, p. 122.

(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—6—1909, 10 spec.

60. Epimeria loricata G. O. Sars.

Epimeria loricata G. O. Sars, Crust. et Pycnog. nova, Archiv f. Mat. og Naturvid., vol. 4, 1879, p. 450.
* — — — Account, vol. 1, Amphip., 1895, p. 368, Pl. 129, fig. 3.
— — Stebbing, Tierreich, p. 322 (ubi litt.).
— — H. J. Hansen, V. Grønland 1887, p. 126.

(St. 431) 63° 24′ N, 53° 10′ W, 892 m., trawl, 9—6—1909, 1 spec.
(St. 396) 66° 41′ N, 56° 17′ W, 150 fath., trawl, 31—5—1909, 1 spec.
(St. 397) 66° 42′ N, 56° 12′ W, 130 fath., trawl, 31—5—1909, 1 spec.

The largest specimen (St. 397) is 38 mm. long.

61. Acanthonotosoma inflatum Kr.

Acanthonotus inflatus Krøyer, Nye nord. Slægt. og Arter af Amfip, Naturh. Tidsskrift vol. 4, 1842, p. 161.
* *Vertumnus* — Goës, Crust. Amphip. Spetsberg., Öfvers. Kgl. Svenska Vet. Akad. Förh., 1866, p. 523, Pl. 38, fig. 11.
Acanthonotozoma inflatum Stebbing, Tierreich, p. 219.
Acanthonotosoma — H. J. Hansen, V. Grønland 1887, p. 127.

(St. 143) Outside the Mudderbugt (Disco) 128 fath., trawl, 22—7—1908, 1 spec.

62. Acanthonotosoma serratum O. Fabr.

Oniscus serratus O. Fabricius, Fauna Groenlandica, 1780, p. 262, No. 237.
**Acanthonotosoma serratum* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 374, Pl. 131, fig. 1.
Acanthonotozoma — Stebbing, Tierreich, p. 218.
Acanthonotosoma — H. J. Hansen, V. Grønland 1887, p. 127.

(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—6—1909, 1 spec.

63. Acanthozone cuspidata Lepechin.

Oniscus cuspidatus Lepechin, Tres Onisc. spec. descript., Acta Acad. Scient. Imp. Petrop., 1778, pars 1, p. 247, Pl. 8, fig. 3.

**Acanthozone cuspidata* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 370, Pl. 130.
?*Paramphithoe hystrix* Stebbing, Tierreich, p. 325 (ubi litt.).
Acanthozone cuspidata H. J. Hansen, V. Grønland 1887, p. 128.

(St. 143) Outside the Mudderbugt (Disco), 128 fath., trawl, 22—7—1908, ca. 20 spec.

64. **Parapleustes latipes** M. Sars.

Amphithoe latipes M. Sars, Oversigt ov. Norges Arkt. Krebsdyr, Forhandl. Vid. Selsk. Christiania 1858 (1859), p. 139.
**Parapleustes latipes* G. O. Sars, Account, vol. 1, Amphip., 1895, p. 360, Pl. 127.
Sympleustes — Stebbing, Tierreich, p. 317 (ubi litt.).
Amphitopsis — H. J. Hansen, V. Grønland 1887, p. 135, Pl. 5, fig. 4,

(St. 367) 66° 22′ N, 57° 16′ W, 686 m., dredge, 19—5—1909, 1 spec.

65. **Syrrhoe crenulata** Goês.

Syrrhoe crenulata Goës, Crust. Amphip. Spetsberg., Öfvers. Kgl. Svenska Vet. Akad. Förhandl., 1866, p. 527, Pl. 40, fig. 25.
* — — G. O. Sars, Account, vol. 1, Amphip. 1895, p. 390. Pl. 136.
— — Stebbing, Tierreich, p. 282 (ubi litt.).
— — H. J. Hansen, V. Grønland 1887, p. 103.

(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—6—1909, 3 spec.

66. **Pardalisca cuspidata** Kr. (non Buchholz).

Pardalisca cuspidata Krøyer, Nye nord. Sl. og Arter af Amfip., Nat. Tidsskrift, vol. 4, 1842, p. 153.
* — — G. O. Sars, Account, vol. 1, Amphip., 1895, p. 403, Pl. 141, Pl. 142, fig. 1.
— — Stebbing, Tierreich, p. 223 (ubi litt.).
? — — H. J. Hansen, V. Grønland 1887, p. 143.
non — — Buchholz, Zweite Deutsche Nordpolarfahrt, vol. 2, Crust. 1874, p. 306, Pl. 1, fig. 3, Pl. 2, fig. 1 (= P. abyssi Boeck, teste Stebbing, Tierreich, p. 222).

(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—5—1909, 2 spec.

67. **Eusirus Tjalfiensis n. sp.**

(St. 171) 70° 41′ N, 52° 07′ W, 386 fath., 800 m. wire, 6—8—1908, 1 spec.

At the mentioned locality the "Tjalfe" has taken one specimen, unfortunately rather defective, of a new species of the genus *Eusirus*.

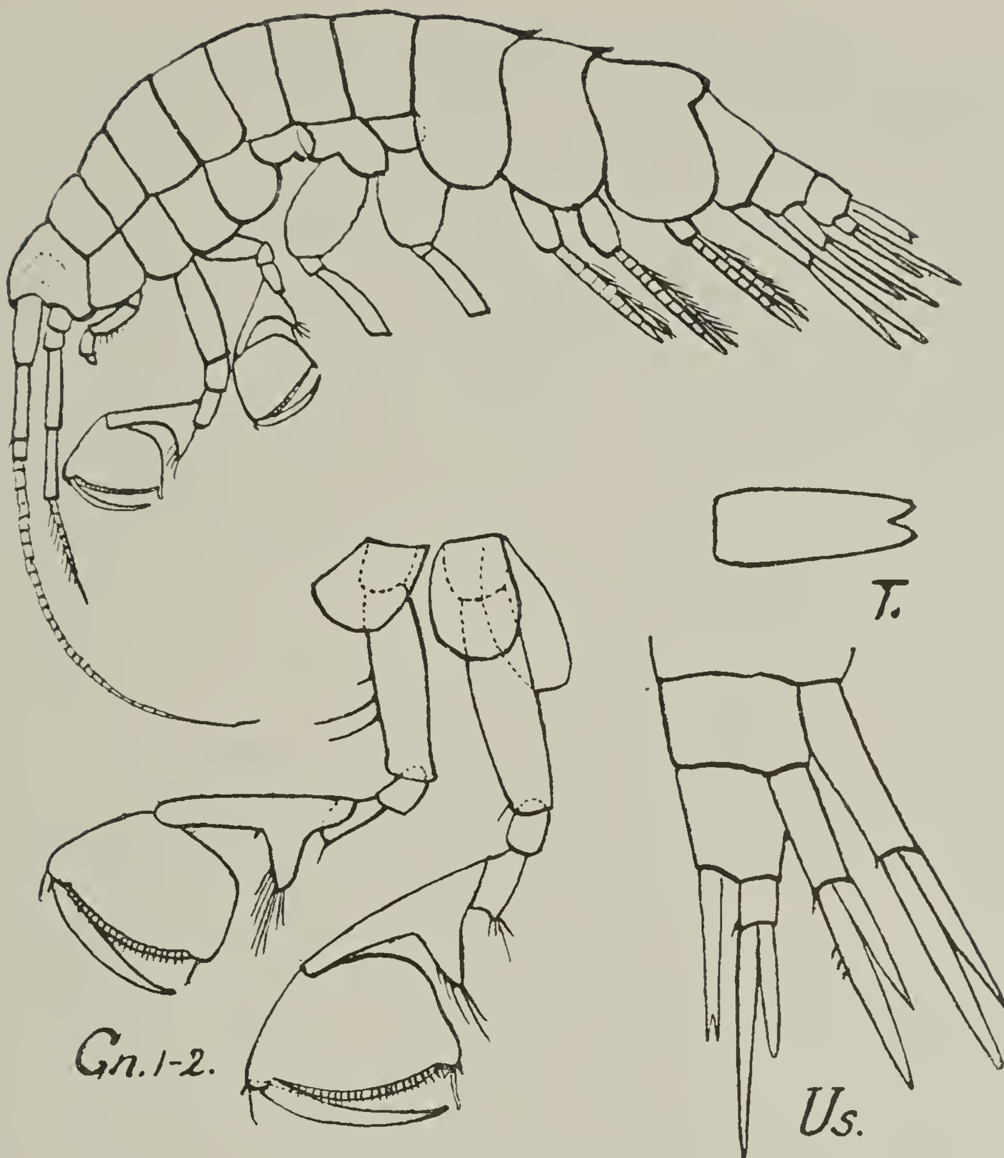


Fig. 5. *Eusirus Tjalfiensis.*

Total length 8 mm.

Of the known species of the genus it is most like *E. cuspi-latus* Kr., but it differs chiefly in the following regards. The eyes ıre almost quite invisible. The pereion segment 7 has no tooth n the dorsal line, and the pleon segments 1 and 2 are evenly ounded on the hinder lateral corners. The convex lateral margin f the posterior edge of the pleon segment 3 seems to have ome single small teeth. The telson is most like that in *E. Holmi* I. J. Hansen. The gnathopoda 1—2 are long and slender, about ıs in *E. Holmi.* The pereiopoda 1—3 are quite lost; the perei-poda 4—5 are only partly preserved. The specimen seems to e a ♂; at all events it has no marsupial plates.

As may be seen the description is very imperfect, for only ne specimen was brought home, and this single specimen was very lefective, as is said above; but in the figures I have given all letails to be seen without dissection.

68. **Eusirus Holmii** H. J. Hansen.

**Eusirus Holmii* H. J. Hansen, Dijmphna-Togtets zool.-botan. Udbytte, 1887, p. 224, Pl. 22, fig. 1.
— — Stebbing, Tierreich, p. 342 (ubi litt.).

(St. 363) 66° 21′ N, 57° 04′ W, 680 m., 800 m. wire, 18—5—1909, 1 spec.
(St. 171) 70° 41′ N, 52° 07′ W, 386 fath., 800 m. wire, 6—8—1908, 1 spec.

New to W. Greenland; but the species has been taken at E. Greenland (70° 32' N, 8° 11' V, 470 fath. (H. J. Hansen, Meddel. om Grønland, vol. 19, 1895, p. 128); this locality is not mentioned in Stebbing, Tierreich).

69. **Apherusa glacialis** H. J. Hansen.

**Amphitopsis glacialis* H. J. Hansen, V. Grønland 1887, p. 137, Pl. 5, fig. 6.
Apherusa — Stebbing, Tierreich, p. 307 (ubi litt.).

(St. 324) 60° 07′ N, 48° 26′ W, pelagic townet, 3—5—1909, 1 spec.
(St. 321) — — 600 m. wire, — 4 spec.
(St. 465) 62° 58′ N, 50° 52′ W, ca. 25 fath., 21—6—1909, 1 spec.

Like the specimens of H. J. Hansen those from "Tjalfe" are also very imperfect: all have some legs or the antennæ broken.

70. **Amphitopsis longicaudata** Boeck.

Amphitopsis longicaudata Boeck, Forh. Skand. Naturforsker-Møde, 1861, p. 663.
* — — G. O. Sars, Account, vol. 1, Amphip. 1895, p. 456, Pl. 161.
— — Stebbing, Tierreich, p. 289 (ubi litt.).

(St. 143) Outside the Mudderbugt (Disco), 128 fath., trawl, 22—7—1908, ca. 35 spec.

New to Greenland.

71. **Gammarus locusta** L.

Cancer locusta Linné, Fauna Suecica, Edit. altera, 1761, p. 405, No. 2042.
**Gammarus locusta* G. O. Sars, Account, vol. 1, Amphip. 1895, p. 499, Pl. 1, Pl. 176, fig. 1.
— — Stebbing, Tierreich, p. 476 (ubi litt.).
— — H. J. Hansen, V. Grønland 1887, p. 144.

(St. 23) 58° 01′ N, 51° 36′ W, surface, 1—6—1908, 1 spec.
(St. 521) 61° 42′ N, 49° 46′ W, 260 m., 100 m. wire, 9—7—1909, 3 spec.
(St. 434) 62° 53′ N, 54° 15′ W, 1660 m., 1200—1500 m. wire, 9—6—1909, 1 spec.
(St. 30a) 63° 04′ N, 56° 32′ W, 500 m. wire, 7—6—1908, 1 spec.
(St. 30b) — — 70 m. wire, — 1 spec.
(St. 433) 63° 05′ N, 54° 21′ W, 120—180 m. wire, 9—6—1909, 8 spec.
(St. 425) 64° 24′ N, 53° 05′ W, 80—120 m. wire, 8—6—1909, 5 spec.
(St. 423) 65° 03′ N, 54° 16′ W, 80—100—120 m. wire, 7—6—1909, 1 spec.

The localities from the "Tjalfe" show that this species can live pelagically at a much greater distance from the coast, than has been known hitherto. G. O. Sars (l. c., p. 500) writes „.... this species is .... met with in the littoral and sublittoral regions. It also occasionally descends to greater depths, at least to 50 fathoms, and in some places occurs in great abundance among decaying algæ, accumulated on the bottom ...". H. J. Hansen says (l. c., p. 145) „a couple of times it has been taken in the Davis-Strait in the surface" (without locality), but he believes that ordinarily it lives on the bottom at 0—5 fath.; he is of the opinion that localities on 60, 100 or 200 fathoms are not certain.

?72. **Haploops setosa** Boeck.

Haploops setosa Boeck, Crust. Amphip. bor. et arct., Forh. Vid. Selsk. Christiania 1870 (1871), p. 228.
* — — G. O. Sars, Account vol. 1, Amphip., 1895, p. 194, Pl. 68, fig. 1.
— — Stebbing, Tierreich, p. 117 (ubi litt.).
— — H. J. Hansen, V. Grønland 1887, p. 153.

(St. 367) 66° 22′ N, 57° 16′ W, 686 m., dredge, 19—5—1909, 1 spec.

My determination is not sure, because the specimen is somewhat imperfect and has lost the setæ of the dorsal surface.

73. **Unciola crassipes** H. J. Hansen.

**Unciola crassipes* H. J. Hansen, V. Grønland 1887, p. 165, Pl. 6, fig. 6.
— — Stebbing, Tierreich, p. 679.

(St. 367) 66° 22′ N, 57° 16′ W, 686 m., dredge, 19—5—1909, 2 spec.

Isopoda.

74. **Calathura brachiata** Stimps.

Anthura brachiata Stimpson, Marine Invertebr. Grand Manan; Smithson. Contrib. to Knowl., vol. 6, 1854, p. 43.
**Calathura* — G. O. Sars, Account vol. 2, Isop., 1900, p. 46, Pl. 19, fig. 2.
— *branchiata* Richardson, Isop. of N. Am., Bull. U. S. Nat. Mus, No. 54, 1905, p. 72, (ubi litt.), fig. 56—57.
— *brachiata* H. J. Hansen, V. Grønland 1887, p. 181.

(St. 367) 66° 22′ N, 57° 16′ W, 686 m., dredge, 19—5—1909, 6 spec.

75. **Æga psora** L.

Oniscus psora Linné, Systema Naturæ, edit. X, vol. 1, 1758, p. 636.
**Æga* — G. O. Sars, Account vol. 2, Isop., 1900, p. 59, Pl. 24.
— — Richardson, Isop. af N. Am., Bull. U. S. Nat. Mus., No. 54, 1905, p. 168 (ubi litt.), fig. 148.
— — H. J. Hansen, V. Grønland 1887, p. 183.

(St. 396) 66° 41′ N, 56° 17′ W, 150 fath., trawl, 31—5—1909, 2 spec.
(St. 397) 66° 42′ N, 56° 12′ W, 130 fath., trawl, 31—5—1909, 6 spec.

All the specimens were taken free-living on the bottom.

76. **Æga ventrosa** M. Sars.

Æga ventrosa M. Sars, Vid. Selsk. Forh., Christiania, 1859, p. 154.
* — — G. O. Sars, Account vol. 2, Isop., 1900, p. 64, Pl. 26, fig. 3.
— — Richardson, Isop. of N. Am., Bull. U. S. Nat. Mus. No. 54, 1905, p. 187 (ubi litt.), fig. 173—74.
— *Nordenskiöldii*, H. J. Hansen, V. Grønland 1887, p. 184.

(St. 397) 66° 42′ N, 56° 12′ W, 130 fath., trawl, 31—5—1909, 1 spec. (free-living).

77. **Arcturus Baffini** Sabine.

Idotea Baffini Sabine, Suppl. to the App. to Capt. Parry's Voyage, 1824, p. 228, Pl. 1, fig. 4—6.
**Arcturus* — G. O. Sars, Norske Nordhavs-Exp., Crust., 1885, p. 97, Pl. 9, fig. 1—21.
— — Richardson, Isop. of N. Am., Bull. U. S. Nat. Mus. No. 54, 1905, p. 337 (ubi litt.), fig. 367—68.
— — H. J. Hansen, V. Grønland 1887, p. 188.

(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fath., trawl, 5—7—1908, 1 spec.

(St. 107) 68° 20′ N, 54° 03′ W, 220—280 fath., trawl, 9—7—1908, 4 spec.
(St. 199) 68° 28′ N, 54° 47′ W, 184—245 fath., trawl, 18—8—1908, 2 spec.

The two largest specimens (St. 107) are 55 mm. (body) + 68 mm. (ant.) and 45 mm. + 78 mm.; the specimen from St. 100 measures 47 mm. + 70 mm.

78. **Acanthoniscus typhlops** G. O. Sars.

**Acanthoniscus typhlops* G. O. Sars, Norske Nordhavs-Exp., Crust. 1885, p. 119, Pl. 10, fig. 27—30.

(St. 431) 63° 24′ N, 53° 10′ W, 892 m., trawl, 9—6—1909, 1 spec.

New to Greenland. Hitherto it was known only from W. of Lofoten, 68° 21′ N, 10° 40′ E, 457 fath., ÷ 0,7° C. (Sars, l. c.).

79. **Janthe laciniata** G. O. Sars.

Janthe laciniata G. O. Sars, Vid. Selsk. Forh., Christiania 1872, p. 92.
* — — — Account vol. 2, Isop., 1900, p. 101, Pl. 41.

(St. 431) 63° 24′ N, 53° 10′ W, 892 m., trawl, 9—6—1909, 1 spec.
(St. 369) 66° 45′ N, 56° 30′ W, ca. 200 fath., trawl, 20—5—1909, 1 spec.

New to Greenland.

80. **Munneurycope Tjalfiensis**, n. gen. n. sp. (figs. 6—8).

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 1 spec. (♂).

The specimen is very like *Munnopsis (?) Murrayi* Walker (Ann. Mag. Mat. Hist. ser. 7, vol. 12, 1903, p. 227, Pl. 18, figs. 1—6; Tattersall, Isop., Fisheries, Ireland, Sci. Invest. 1904 pt. 2 (1905), p. 24,73, Pl. 5, fig. 8, and Tattersall, Nordisches Plankton vol. 6, Lief. 14, 1911, p. 190, figs. 8—14); but though it is very imperfect, not only the larger part of antennæ and pereiopoda being lost, but also otherwise being damaged, it is yet certain that it is another species.

Both species differ from *Munnopsis typica* G. O. Sars (Sars: Account vol. 2, 1900, Isop., p. 133, Pl. 57—58) in the somewhat regular lanceolate outline, the hinder part of the body being not

suddenly narrower than the first segments. In regard to the mandibles (figs. 7—8) the specimen from the "Tjalfe" is very like *Munnopsis longicornis* H. J. Hansen (Ergebnisse d. Plankton-Exp., vol. 2 G c, Isop., Cumac. und Stomatop., 1895, p. 8, Pl. 2, fig. 1—1d), whilst the mandibles in *M. typica* are quite different from these.

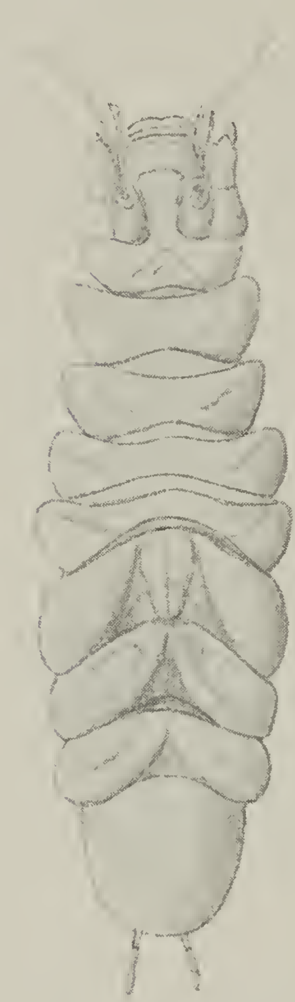


Fig. 6.
Munneurycope Tjalfiensis.

Walker gives no fig. of the mandibles of *M. Murrayi* (Tattersall has a fig.: Fisheries, Ireland, Sci. Invest. 1904 pt. 2, (1905) Pl. 5, fig. 8); but he writes (l. c. 1903 p. 228) „mandibles with a prominent molar expansion and divided cutting edge as in *M. longicornis* Hansen; palp very large and prominent, with a lamellar terminal joint. As G. O. Sars has pointed out, *Munnopsis longicornis* Hansen differs in the structure of the mandibles from the generic description, as does the present species" (*M. Murrayi*).

The sculpture of the dorsal surface is very like that in *M. Murrayi;* the few differences may be seen from the fig. (fig. 6). Of ant. 1 the mutual length of the joints is quite another than in *M. typica*, 4th and 5th joints being longer than the others. Also the flagellum is different, 1st joint being very short and the second very long; the other joints (only 6 are preserved) are about 4 times longer than their diameter. Of ant. 2 only two joints of the stem are preserved; they are of about equal length. Labrum is very prominent, has the usual form and 3 cross-furrows. The oral parts agree very well with those in *M. longicornis* and *M. Murrayi*, whilst the mandibles as mentioned are very different from those in *M. typica.* Of the 4 pairs of ambulatory legs only some single joints are preserved. Of the natatory legs the 4 first joints are preserved; the 4th joint has the same form as in *M. Murrayi* and is a little broader than in *M. longicornis*, but much broader than

in *M. typica.* The uropoda (fig. 7, U.) are half as long as the caudal segment; the second joint 4 times as long as the first.

Lenght 8 mm. The colour is (in alcohol) black-brown, except the caudal segment, which has no colour and is pellucid.

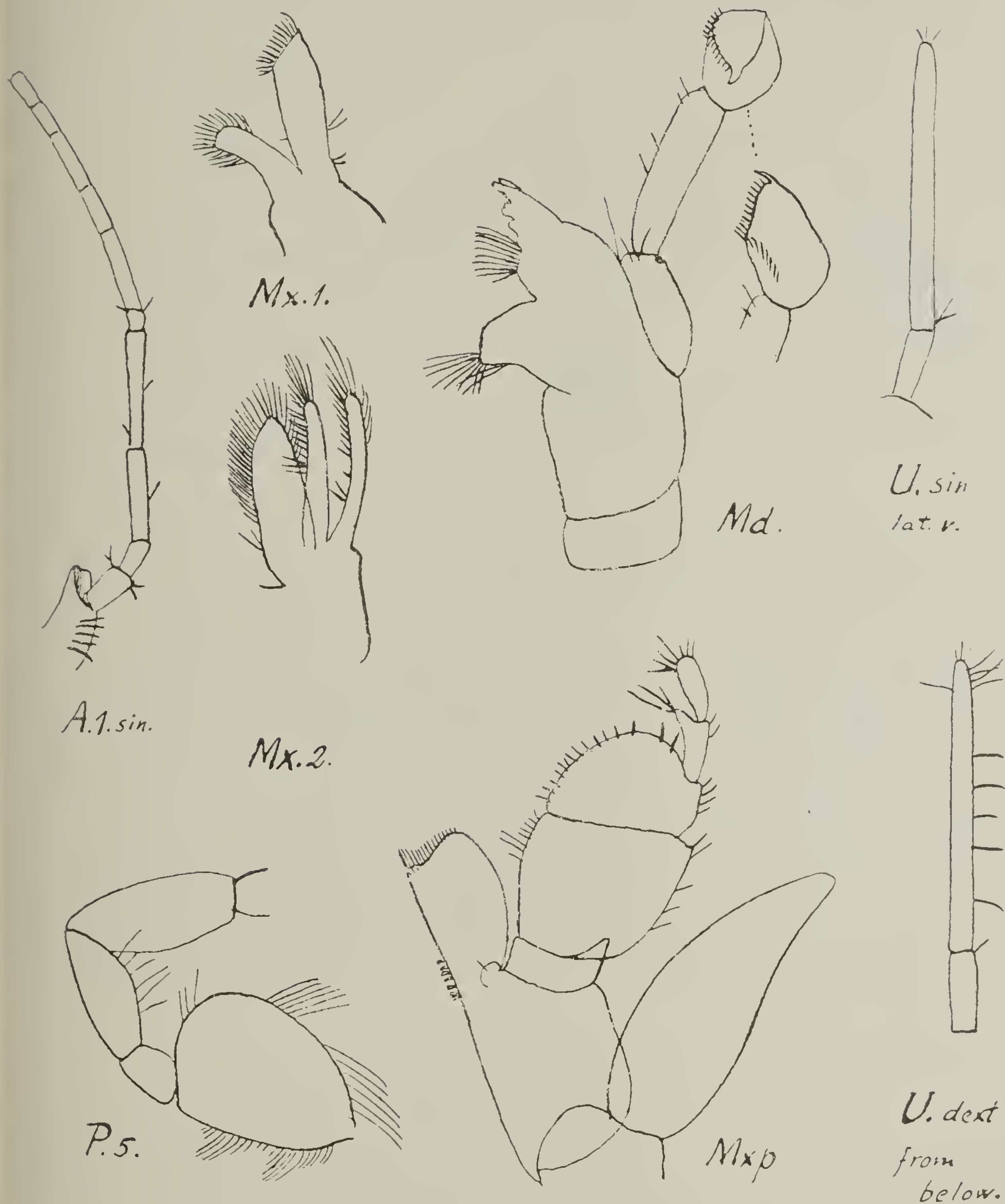


Fig. 7. *Munneurycope Tjalfiensis.*

Though *M. Tjalfiensis* is known but from a single, very imperfect specimen, it may be seen, that it is very closely allied to *M. longicornis*, *M. Murrayi* and a third species not mentioned above, viz. *M. oceanica* Tattersall (Fisheries, Ireland, Sci. Invest. 1904,

pt. 2, (1905) p. 23, 72, Pl. 5, figs. 1—7, and Tattersall, Nordisches Plankton vol. 6, Lief. 14, 1911, p. 187, figs. 1—7), whilst it is very different from *M. typica.* The form of the body, the mandibles and the natatory legs which (probably) have the same form as in the genus *Eurycope*, are such essential differences from *Munnopsis*, that it seems to me necessary to establish a separate genus for it, for which I propose the generic name *Munneurycope.* This genus besides comprises the 3 species *M. longicornis* H. J. Hansen, *M. Murrayi* Walker, and *M. oceanica* Tattersall. I cannot agree with Tattersall who is of opinion (l. c. 1904 (1905), p. 24) that all these species belong to the genus *Munnopsis* G. O. Sars. How the relationship is to the 3 species of F. Beddard in Challenger Report, Isopoda, cannot be decided; but it must be taken for granted that Sars is right, when he says (Account, vol. 2, Isopoda 1900, p. 133) „it is, however. somewhat questionable, if all these species are actually referable to the present genus" (viz. *Munnopsis*).

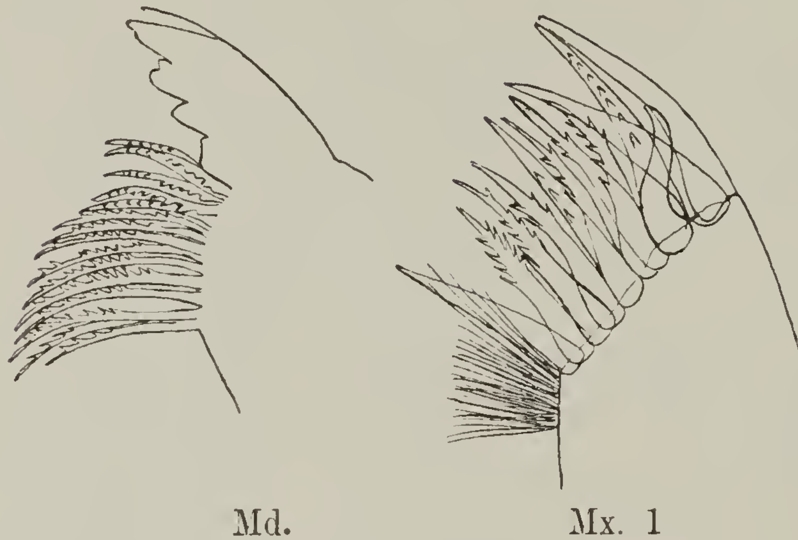


Fig. 8. *Munneurycope Tjalfiensis.* Cutting edge of Md. and Mx. 1.

81. **Phryxus abdominalis** Kr.

Bopyrus abdominalis Krøyer, Naturhist. Tidsskrift, vol. 3, 1840, p. 102-12, 289-99, Pl. 1-2.
— — — in Gaimard, Voyage en Scand., Crust., 1846 (1849?), Pl. 29, fig. 1.
**Phryxus* — G. O. Sars, Account vol. 2, Isop., 1900, p. 215, Pl. 90-91.
— — Richardson, Isop. of N. Am., Bull. U. S. Nat. Museum, No. 54, 1905, p. 500 (ubi litt.), fig. 550-52.
— — H. J. Hansen, V. Grønland 1887, p. 196.

(St. 465) 62° 58′ N, 50° 52′ W, ca. 25 fath., 21—6—1909, 1 spec.
in Spirontocaris turgida.
(St. 179) 69° 29′ N, 55° 26′ W, 116 fath., trawl, 8—8—1908, 3 spec.
in Spirontocaris macilenta.

The species was hitherto not known from *Spiront. macilenta;* Sars (l. c.) mentions as hosts 8 other species of gen. *Spirontocaris* and 3 species of gen. *Pandalus.*

82. **Bopyroides hippolytes** Kr.

Bopyrus Hippolytes Krøyer, Grønlands Amfipoder, Kgl. Danske Vid. Selsk. naturvid.-math. Afh., vol. 7, 1838, p. 306, Pl. 4, fig. 22.
— — — in Gaimard, Voyage en Scand., Crust. 1846 (1849?) Pl. 28, fig. 2.
**Bopyroides* — G. O. Sars, Account vol. 2, Isop., 1900, p. 199, Pl. 84, fig. 2.
— — Richardson, Isop. of N. Am., Bull. U. S. Nat. Mus. No. 54, 1905, p. 567 (ubi litt.), fig. 628-37.
Gyge — H. J. Hansen, V. Grønland 1887, p. 197.

(St. 465) 62° 58′ N, 50° 52′ W, ca. 25 fath., 21—6—1909, 1 spec.
on Spirontocaris polaris.
(St. 100) 66° 44′ N, 56° 08′ W, ca. 175 fath., 5—7—1908, 1 spec.
on Spirontocaris macilenta.

This species like *Phryxus abdominalis* was hitherto not known from *Spiront. macilenta*; Sars (l. c.) mentions as hosts 3 other species of gen. *Spirontocaris.*

Fam. Dajidæ.

The characters for the family see G. O. Sars, Account vol. 2, Isop. 1900, p. 221.

A synopsis of the genera (partly also of the species) is given in Stebbing, A history of Crustacea, Recent Malacostraca, The international scientific series, vol. 74, 1893, p. 398—400. — A short synopsis (with litt.) is given by H. Richardson in Proc. U. S. Nat. Mus. vol. 33, 1908, p. 689 and (without litt.) by Koehler in Bull. Inst. Océangr. Monaco, No. 196, 1911, p. 31—34.

Synopsis of the species (the genera are in chronological order).

1. *Dajus Mysidis* Krøyer, in Gaimard, Voyage en Scand., Crust. 1846 (1849?), Pl. 28, fig. 1—2, Pl. 29, fig. 1.
   * — — G. O. Sars, Account vol. 2, Isopoda 1900. Pl. 223, Pl. 93—94.
   — — Richardson, Monograph of Isop. N. Am., Bull. U. S. Nat. Mus. No. 54, 1905, p. 573 (ubi litt.), fig. 638.
   In the marsupium of *Mysis oculata* or *M. mixta;* arctic, length 4 mm.

2. *Dajus Siriellæ* G. O. Sars, Challenger Report, Zool. vol. 13, 1885, Schizop., p. 220—21, Pl. 38, fig. 12—14. »Attached to the ventral face of the trunk posteriorly on a few specimens of *Siriella Thomsoni* Milne Edwards, both males and females, in the latter lying partly within the marsupial pouch, as was also the case with *Dajus Mysidis.*"

3. *Aspidophryxus peltatus* G. O. Sars, Oversigt af Norges Crust. I, Vid. Selsk. Forhandl., Christiania 1882, p. 72, Pl. 2, fig. 12—15.
   * — — G. O. Sars, Account vol. 2, Isop. 1900, p. 228, Pl. 96.
   — — Tattersall, Fisheries, Ireland, Sci. Invest. 1904, pt. 1 (1905), p. 76, 82.
   — — — Nordisches Plankton, vol. 6, 1911 (Lief. 14), p. 244, fig. 139—44, p. 290, fig. 283—87.
   — *Sarsii* Giard & Bonnier, Epicarides de la fam. des Dajidæ. Bull. Scient. France et Belgique, 1889, p. 266.
   Length 3 mm. On the carapace of *Erythrops* or (seldom) *Mysidopsis didelphys* or *Parerythrops obesa.* Norway (Sars), Scotland (Scott), Ireland (Tattersall). Dr. Th. Mortensen has taken the species on *Erythrops (pygmœa?),* Kristineberg zool. St. (Gulmarfjord, Bohuslän), 60 m., 11—1—1910.

4. *Aspidophryxus frontalis* Bonnier, in Koehler: Isop. nouveaux de la fam. des Dajides. Bull. Inst Océanogr. No. 196, Monaco 1911, p. 2—10, fig. 1—7. — The larva: Tattersall: Nordisches Plankton, vol. 6, 1911 (Lief. 14.), p. 291, fig. 288—93.
   Length 1,4 m. On rostrum of *Siriella norvegica,* 34° N, 8° 10′ W, surface.

5. *Notophryxus ovoides* G. O. Sars, Oversigt af Norges Crust. I, Vid. Selsk. Forh., Christiania, 1882, p. 71, Pl. 2, fig. 9—11.
   * — — G. O. Sars, Account vol. 2, Isop. 1900, p. 226, Pl. 95.
   — — Tattersall, Nordisches Plankton, vol. 6 (Lief. 14), 1911, p. 252, fig. 156—61, p. 266, fig. 192.
   Length 3,5 mm., on the abdomen of *Amblyops abbreviata,* Norway.

6. *Notophryxus lateralis* G. O. Sars, Challenger Report, Zool., vol. 13, 1885, Schizopoda, p. 220, Pl. 38, fig. 9—10. On the gills of *Nematoscelis megalops,* South Atlantic.

7. **Notophryxus clypeatus* G. O. Sars, Norske Nordhavs-Exp., Crust. 1, 1885, p. 137, Pl. 11, fig. 30—33.
Leptophryxus clypeatus G. O. Sars, Crust. et Pycnog. nova. Prodromus, Archiv f. Mathemat. og Naturvid., Kristiania 1879, p. 436. Length 5 mm.; on the dorsal surface of the carapace of *Pseudomma roseum,* W. Norway (63° 10′ N, 5° 0′ E, 763 m.).
? *Notophryxus sp. (N. clypeatus* G. O. Sars?) Tattersall, Isop., Fisheries, Ireland, Sci. Invest. 1904, pt. 2 (1905), p. 76. On *Pseudomma roseum,* S. W. Ireland.

8. **Notophryxus globularis* G. O. Sars, Challenger Report, Zool., vol. 13, Schizopoda, p. 220, Pl. 38, fig. 11.
— — Tattersall, Nordisches Plankton, vol. 6, 1911 (Lief. 14), p. 255, fig. 164.
On the dorsal surface of the carapace of *Thysanoëssa gregaria,* North Pacific.

9. **Heterophryxus appendiculatus* G. O. Sars, Challenger Report, Zool. vol. 13, Schizop., 1885, p. 220, Pl. 38, fig. 8.
**H. app.* Tattersall, Isop., Fisheries, Ireland, Sci. Invest. 1904, pt. 2, (1905), p. 77, Pl. 11, fig. 1—4.
H. app. Tattersall, Nordisches Plankton, vol. 6, Lief. 14, 1911, p. 247. fig. 146—49.
On *Euphausia pellucida* (and *E. Mülleri?).* Cape Verde-Isles (Sars), Mediterranean (Lo-Bianco), Bay of Biscay (Fowler). W. Ireland (47° 14′ N, 7° 58′ W, Tattersall).

10. *Branchiophryxus nyctiphanæ* Caullery, Zool. Anzeiger vol. 20, 1897. p. 88, fig. 1—2. — A short report in Journ. Royal Microsc. Soc. London 1897, pt. 3, p. 204.
Length 1,4—2 mm. On the gills of *Meganyctiphanes norvegica.* Golfe de Gascogne.

11. *Branchiophryxus Caulleryi* Koehler, Isop. nouveaux de la fam. des Dajides, Bull. Inst. Océanogr. Monaco, No. 196, 1911, p. 26—30, fig. 18—21.
Length 0,72 mm. On gills of *Stylecheiron longicorne.*

12. *Prodajus lobiancoi* Bonnier, in Lo Bianco: Le pesche abissali esseguite de F. A. Krupp col yacht Puritan nelle adiacente di Capri ed in altre località del Mediterraneo. Mitt. Zool. Stat. Neapel, vol. 16, 1903, p. 260 (no fig.).
Pr. lob. Bonnier, Comptes Rendus Séances Acad., Paris, vol. 136, 1903. p. 103 (no fig.).

Prodajus lobiancoi Tattersall, Nordisches Plankton, vol. 6, Lief. 14, 1911, p. 249.
Length 2 mm. In the marsupium (?) of *Gastrosaccus Normani,* Mediterranean.

13. **Prodajus ostendensis* Gilson, Bull. sc. France et Belgique, tome 43, 1909, p. 19—92, Pl. 1—2.
**P. ost.* H. J. Hansen, Vid. Medd. Nat. Foren. Kbhv. 1909 (1910), p. 221—24, Pl. 3, fig. 3, Pl. 4, Pl. 5, fig. 1.
P. ost. Tattersall, Nordisches Plankton, vol. 6, Lief. 14, 1911, p. 250, fig. 150—55, p. 265, fig. 190—91.
Length 3,5 mm. In the marsupium of *Gastrosaccus spinifer,* North Sea.

14. *Zonophryxus retrodens* Richardson, U. S. Fish Commission Bull., 1903, p. 51—52, fig. 4—5.
Length 11,5 mm. Hawaiian Islands. Host unknown.

15. *Zonophryxus trilobus* Richardson, Department of commerce and labor, Bureau of fisheries; document No. 736, Washington 1910, p. 41, fig. 39.
Length 14 mm. Philippine Islands. Host unknown.

16. *Zonophryxus Grimaldii* Koehler, Bull. Inst. Océanogr. Monaco, No. 196, 1911, p. 16—22, fig. 13—14.
Length 16 mm. (immature). 36° 14′ N, 8° 06′ W, Host *Heterocarpus Grimaldii?*

17. **Holophryxus alaskensis* Richardson, U. S. Fish Commission, Bull. vol. 24, 1904 (1905), p. 220—21, fig. 8—10.
H. al. Richardson, Monogr. Isop. N. Am., Bull. U. S. Nat. Mus. No. 54, 1905, p. 576, fig. 639—41.
Length 10 mm. Alaska. Host unknown.

18. **Holophryxus Giardi* Richardson, Proc. U. S. Nat. Mus., vol. 33, 1908, p. 690—92, fig. 1—3.
H. G. Richardson, Proc. U. S. Nat. Mus. vol. 37, 1909 (1910), p. 123.
- - — Department of commerce and labor, Bureau fisheries, document No. 736, Washington 1910, p. 41.
Length 39 mm. On the dorsal surface of the carapace of *Gennadas borealis.* Bering Island, Philippine Islands.

19. **Holophryxus californiensis* Richardson, Proc. U. S. Nat. Mus. vol. 33, 1908, p. 692—94, fig. 4—5.
H. cal. Richardson, Proc. U. S. Nat. Mus. vol. 37, 1909 (1910), p. 123.
Length ca. 20 mm. (?) On the dorsal surface of *Pasiphœa pacifica.* California.

20. *Holophryxus Richardi* Koehler, Bull. Inst. Océanogr. Monaco, No. 196, 1911, p. 23—26, fig. 15—17; — see also No. 83-a., p. 108.
Holophryxus sp. (H. Richardi Koehler?) see No. 83-b., p. 109.

21. *Holophryxus Acanthephyræ* n. sp., see Nr. 84, p. 112.

22. *Arthrophryxus beringianus* Richardson, Proc. U. S. Nat. Mus. vol. 33, 1908, p. 694—96, fig. 6—7.
Length 14 mm. On *Eucopia australis*. Bering Island.

23. *Colophryxus novangliæ* Richardson, Proc. U. S. Nat. Mus. vol. 34, 1908, p. 391—92, fig. 1—3.
Length 5 mm. Long Island. Host unknown.

24. *Prophryxus alascensis* Richardson, Proc. U. S. Nat. Mus. vol. 37, 1909 (1910), p. 124, fig. 47—48.
Length 2,3 mm. Alaska. Host unknown (a Schizopod?).

25. *Allophryxus ruber* Koehler, Bull. Inst. Océanogr. Monaco, No. 196, 1911, p. 10—16, fig. 8—12.
Length 6,5 mm. 43° 04′ N, 19° 42′ W, 0—1500 m.; 46° 31′ 20" N, 5° 13′ W, 0—1750 m. Host unknown.

The male is known in the following species.

Dajus mysidis.
Notophryxus ovoides.
Aspidophryxus peltatus
— *frontalis*
Heterophryxus appendiculatus
Branchiophryxus nyctiphanæ (no fig.)
— *Caulleryi*
Prodajus ostendensis
Zonophryxus retrodens
Holophryxus californiensis
Arthrophryxus beringianus
Colophryxus novangliæ
Allophryxus ruber

The larva is known in the following species.

Dajus Mysidis
Notophryxus ovoides
Aspidophryxus peltatus
— *frontalis*
Branchiophryxus nyctiphanæ (no fig.)
— *Caulleryi*
Prodajus ostendensis
Holophryxus Acanthephyræ (see p. 115, fig. 19—21.)

Besides these H. J. Hansen in Ergebnisse d. Plankton-Exp. d. Humboldt-Stiftung, vol. 2, G, c, 1895, p. 22—27 and p. 45—46, Pl. 2, figs. 3—6, Pl. 3, figs. 1—2, has described 6 larvæ of unknown species and states that Dr. v. Schab has two not-described larvæ from the Guinea-coast.

83a. **Holophryxus Richardi** Koehler (figs. 9—10).

Holophryxus Richardi Koehler, Isop. nouveaux de la fam. des Dajides provenant des campagnes de la „Princesse Alice“, Bull. Inst. Océanogr. Monaco, No. 196, 1911, p. 23—26, figs. 15—17.

(St. 363) 66° 21′ N, 57° 04′ W, 680 m., 800 m. wire, 18—5—1909. 1 ♀

At the station mentioned above the „Tjalfe“ has taken a specimen of *Holophryxus Richardi.* The specimen from the „Tjalfe“ is about $2^1/_2$ times longer than that of Koehler (l. c.) viz. 9 mm. long and 4 mm. broad. Though on account of the difference in size there are



Fig. 9.
Holophryxus Richardi.
Ventral view.



Fig. 10.
Holophryxus Richardi.
Dorsal view (a little from the left) and lateral view (from the rigth).

great differences, it is evident that the two specimens belong to the same species, as may especially be concluded from the form of the appendages on the 5th pair of incubatory plates (oostégites). A detailed description I find superfluous, as all, that I have been able to see, may be seen from my figs; and a close examination was impossible, as I had but one single specimen; for this reason I cannot render a nearer account of the antennæ and the oral parts.

1st antenna seems to have 2 joints. Also 2nd antenna seems to be two-jointed, but is much bigger; on the 1st joint a little bud-like process may be seen. The oral parts are not visible, not even the tip of the mandibles, which generally project a little. There are 5 pairs of incubatory plates; but what seems to be the third pair is the 4th, the third pair being concealed by the 4th. The 5th pair have in the hind part a crest, on the left plate with 8, on the right plate with 6 teeth; such crests are also to be found in the other specimens of the genus *Holophryxus* from the „Tjalfe" (No. 83b and 84), but are not described in any other species. The left incubatory plate of 5th pair is, as shown in the fig., divided into two lappets, which seems to be caused by accidental molestation.

The colour is (in alcohol) pale yellow.

Neither the male nor ova were found.

The host is unknown. A specimen of *Eusirus Holmii* (No. 68) is the sole Crustacean brought home from this station, and though it was not probable that a Dajid should be a parasite on an Amphipod, I have closely examined this specimen, but it has no traces showing that it has been the host of the parasite. But from the journal it may be seen, that at the stat. mentioned were taken a Mysid (probably *Boreomysis microps), Gennadas elegans* and *Sergestes arcticus*; all these animals not being preserved I have not been able to find the host; for the rest see the next species, No. 83b!

83b. **Holophryxus sp. (H. Richardi** Koehler?) (figs. 11—14 [13 partly]).

(St. 346) 64° 22′ N, 56° 00′ W, 400—800 m. wire, 10—5—1909. 1 ♀ on Sergestes arcticus.

From this stat. the „Tjalfe" has brought home a *Holophryxus*, 14 mm. long, 5,5 mm. broad. The form is the same as in the other species of the genus, but somewhat more lengthened.

Articulation of the antennæ is not visible; but the tip of the mandibles may be seen to project a little. Only 3 pairs

of incubatory plates are visible, viz. 2nd, 4th and 5th pairs; close to the hind edge of the 5th pair a pair of little acuminated appendages are to be seen, and on the hind edge of the right plate (but not on the left) a little bud-like prominence may further be seen. Each of the crests on the 5th pair of plates seems to have 12 teeth. The 5th pair of plates are very large and contiguous in the middle line; this I cannot understand otherwise than that the animal is mature, though it has no ova. — Ova or ♂ were not found.

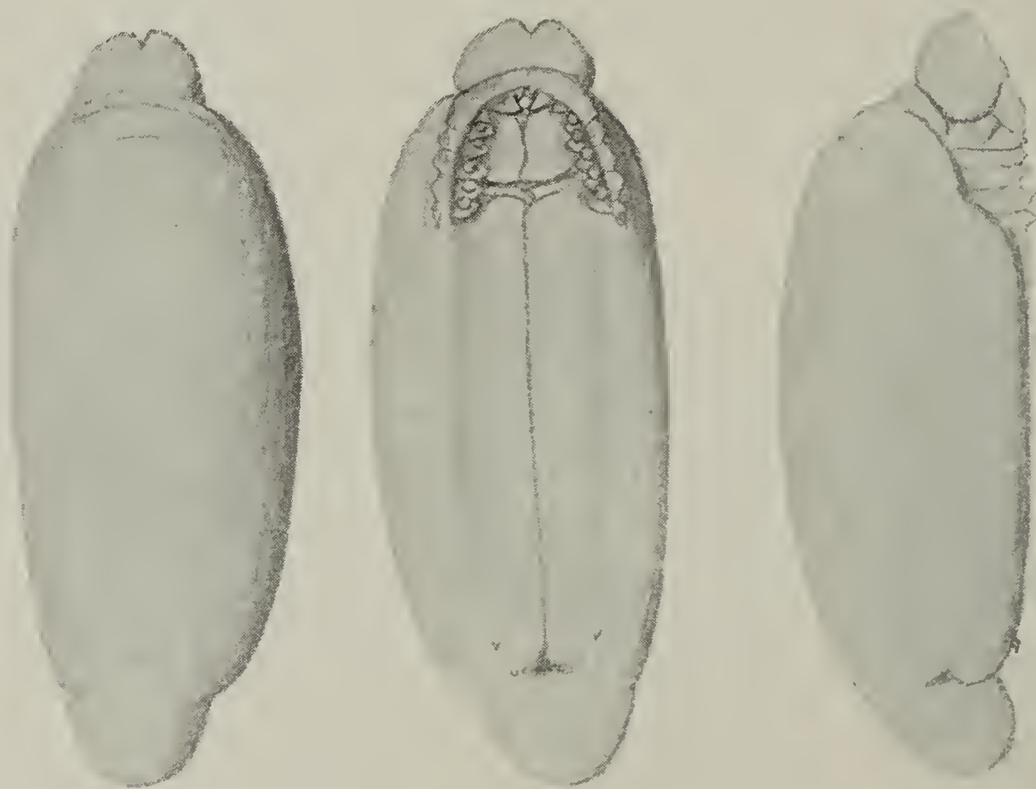


Fig. 11. *Holophryxus (Richardi?).*
Dorsal, ventral and lateral view.

The colour is (in alcohol) pale-yellow.

The appendages on the 5th pair of incubatory plates I apprehend as showing that this specimen is the fully grown female of *H. Richardi,* and this I base on the following. (For the sake of convenience I call Koehler's specimen stage 1, the two others (from the „Tjalfe" St. 363 and 346) stage 2 and 3).

1. The cephalon projects in stage 3 still more than in stage 2, stage 1 has in front of the cephalon a broad projecting part, formed partly by the first pair of coxal plates. In stage 2 the cephalon only projects a little beyond the projecting part. In stage

3 the cephalon is more distinctly bilobate than in stage 2; in stage 1 the cephalon is rounded without any trace of a furrow.

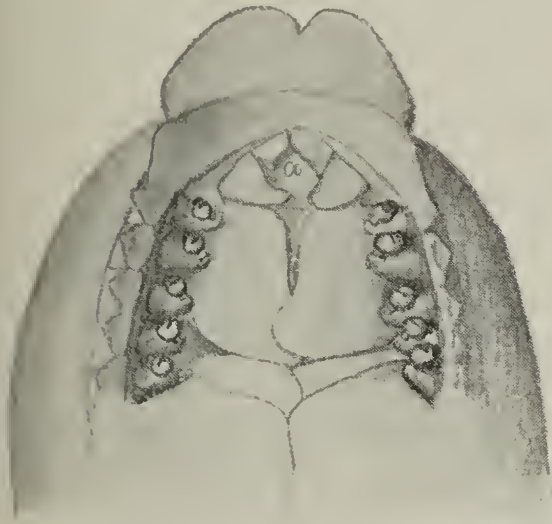


Fig. 12. *Holophryxus (Richardi?).* The oral area.

2. The size of the specimens is enlarged (stage 1 3,7 mm. long, stage 2 9 mm., stage 3 14 mm.), but the relative breadth is diminished (stage 1 2:3,7 mm. = 1:1,85; stage 2 4:9 mm. = 1:2,25; stage 3 14:5,5 mm. = 1:2,55).

3. Each species of Dajidæ has, as far as we know, only one single species as host (excluding *Dajus Mysidis)*, and here the host probably in all 3 cases was *Sergestes arcticus.* Stage 1 was taken 33° 41′ N, 36° 55′ W, 0—2500 m., thus in the territory of distribution of *Sergestes arcticus* (see H. J. Hansen, Ingolf 1908, p. 82); stage 2 was taken together with *Sergestes*, and stage 3 was found fixed to *Sergestes.*

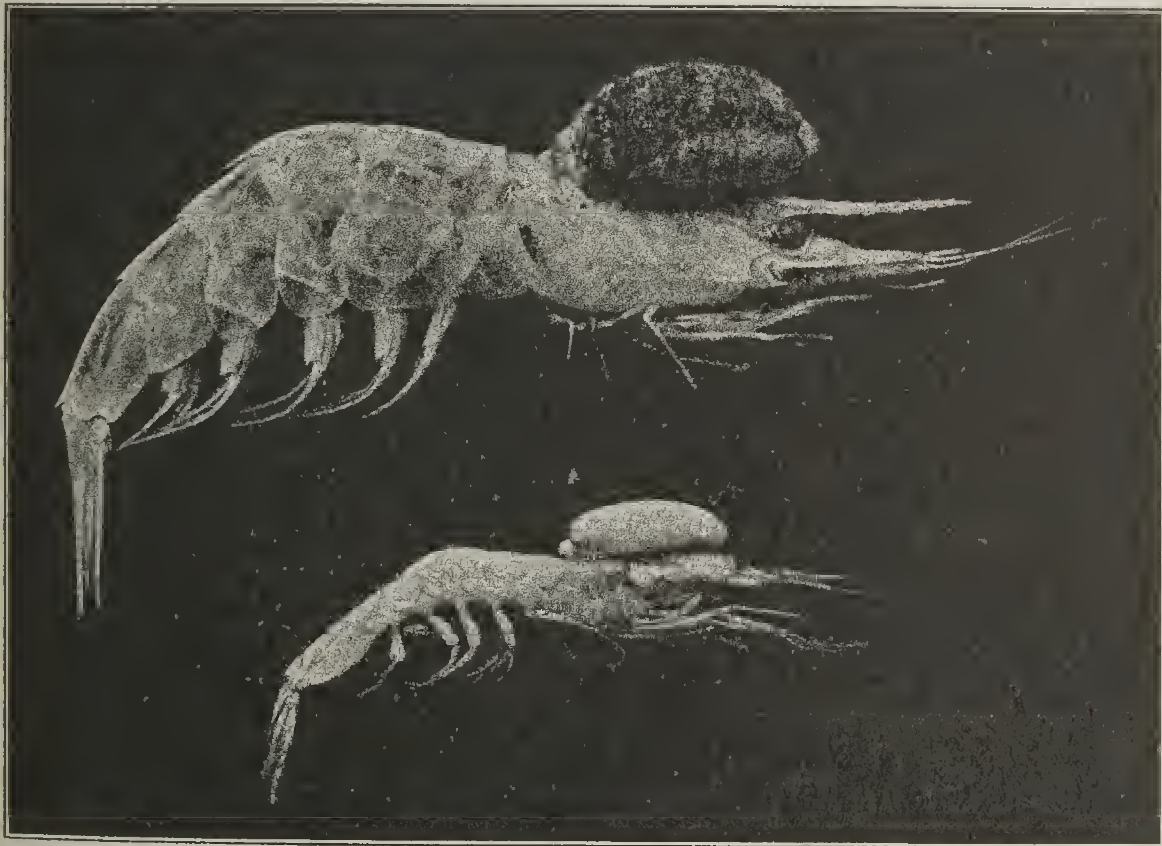


Fig. 13. *Holophryxus Acanthephyræ* on *Acanthephyra purpurea* (above) and *Holophryxus (Richardi?)* on *Sergestes arcticus* (below).

The 3 specimens giving thus together a very distinct series of development, I think there is no doubt that they all belong to the same species.

The relation to the host is not mentioned for any Dajid; the authors only mention the place, where the parasite is fixed. The specimen from the „Tjalfe" St. 346 was, as shown in figs. 13—14, fixed on the hind part of the dorsal surface of the carapace of the *Sergestes* with the cephalon turned towards the abdomen of the host, just as H. Richardson has figured *Holophryxus Giardi* and *H. californiensis*. The carapace of the *Sergestes* has dark holes from the mouth and pereiopoda of the parasite (see fig. 14); also it may be seen, that the *Holophryxus* has removed its legs 2 or 3 times (together with its growth?).



Fig. 14.
Hindpart of the carapace of *Sergestes arcticus* with the marks of the mouth and pereiopoda of *Holophryxus* (*Richardi?*).

As the parasite is fixed quite superficially to the host, some very interesting questions arise. Does the parasite only live as long as the time between two castings of the skin of the host? Does it prevent the host from casting the skin? — To answer these questions is quite impossible at the present moment.

84. **Holophryxus Acanthephyræ** n. sp. (fig. 13 [partly], 15—21).

(St. 322) 60° 07′ N, 48° 26′ W, 2000 m. wire, 3—5—1909, 1 spec. (♀) on Acanthephyra purpurea.

As I have had but one single specimen, a closer examination and dissection was not possible; therefore the following description can not give all details.

Length 22 mm., breadth 12,5 mm.

The specimen is very like *H. californiensis* from California (H. Richardson, Proc. U. S. Nat. Mus. vol. 33, 1908, p. 692—94, figs. 4—5). From Miss Richardson's very short description and her indistinct photographic fig. it cannot with security be determ-

ined, that the specimen from the „Tjalfe" is not *H. californiensis*, and moreover I have no male. But the circumstance, that the host belongs to quite another genus (*H. calif.* lives on *Pasiphœa pacifica*), and that the locality besides is W. of America, seems to me to prove, that the specimen from the „Tjalfe" is a new species.

The form is ovate and somewhat skew, the left side being a little longer than the right. The cephalon cannot be seen from below; it is very small and has a little longitudinal furrow, but is

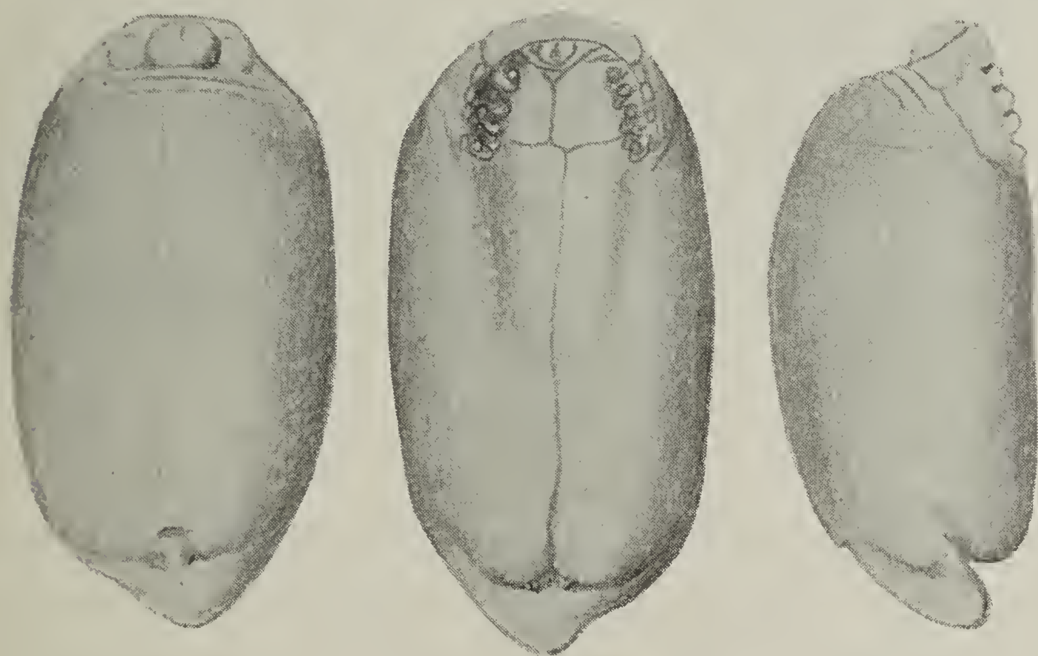


Fig. 15.
Holophryxus Acanthephyræ. Dorsal, ventral and lateral view.

not really bilobated; at each side of the cephalon there is a little rounded prominence. On the dorsal surface of the thorax just behind the cephalon 2 transversal furrows are visible; otherwise there is no trace of segmentation of the thorax (seen dorsally) exclusive of the existence of 4 longitudinal streaks on the dorsal surface, somewhat recalling the segmentation of the abdomen in the Paguridæ. The abdomen projects from the thorax as in the other species. The coxal plates are the sole true trace of segmentation. There are 5 pairs of coxal plates corresponding with the 5 pairs of pereiopods; the 4 first pairs are separated from the thorax by a seam, and the two plates of the first pair are connected by a frontal margin lying under the cephalon and forming the anterior boundary

of the oral area. There are very slight seams between the coxal plates exclusive of those between the two last pairs; the fifth pair are very small.

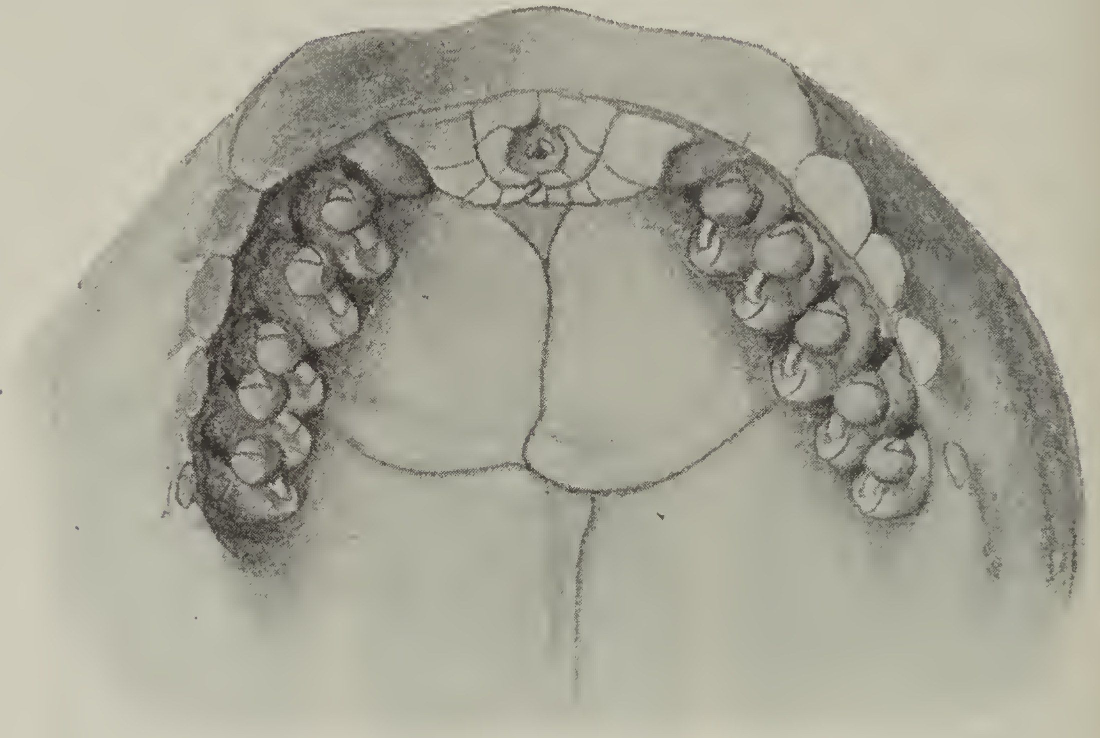


Fig. 16. *Holophryxus Acanthephyræ.* The oral area.

The ventral surface is, exclusive of the hindpart, somewhat concave. The oral area with the pereiopods is rather small and about semicircular. The antennæ seem to be articulated, the first

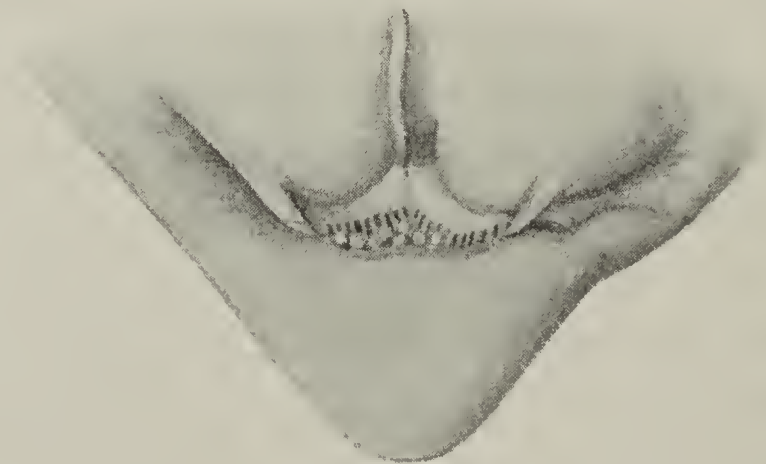


Fig. 17. *Holophryxus Acanthephyræ.*
Hind part from below.

pair in 3, the second pair in 5 joints; but it is not excluded that the apparent articulation is in reality simple folds. Between the antennæ the tip of the mandibles is visible. The gnathopod lies

between antenna 2 and the first pereiopod and is quite unarticulated. The 5 pairs of pereiopods have about the same form as those in *Zonophryxus Grimaldii* (Koehler, Bull. Inst. Océanogr., Monaco No. 196, 1911, fig. 13, p. 17); they seem to have but 5 joints, and the 4th joint is quite globular. Only two pairs of incubatory plates are visible, and it has been impossible without dissection to examine if there are more plates. The hind-plates have the usual crest, each with about 14 teeth; inside the teeth some embryos are visible. The abdomen has no traces either of segmentation or of pleopods or uropods.

The colour is (in alcohol) reddish brown spotted with yellow.

The specimen was fixed to the host (see fig. 13) quite as *Holophryxus* sp. (No. 83 b), but somewhat obliquely towards the right side of the host; there was a large spot as trace of the mouth of the parasite, and it may be seen, that this has changed its place 4—5 times.



Fig. 18.
Holophryxus Acanthephyræ. The marks of the mouth and pereiopoda, and the carapace of *Acanthephyra* with these marks.

No male was found.

The space within the incubatory plates is quite filled with embryos. These are pale-yellow, 0,2 mm. long. On account of the colour a closer examination of the larvæ was impossible without special preparation. But Prof. H. F. Jungersen who has a great experience in preparatory-methods, has kindly prepared for me some specimens with potash and pyrogallic acid; for this I owe him my best thanks, for otherwise I would not have been able to give good figures with all details.

The larvæ are very like partly those of *Dajus Mysidis* (G. O. Sars, Account vol. 2, Pl. 94, larva), partly those of *Clypeoniscus Meinertii* (Giard et Bonnier, Bull. Scientifique France et Belgique, vol. 25, 1893. p. 421; Richardson, Monograph of Isopoda N.-America,

Bull. U. S. Nat.-Mus., No. 54, 1905, figs. p. 580). The body is curved ventrally and consists of cephalon and 12 segments. There is no trace of an eye. The 1st antenna is small, short, bud-like,

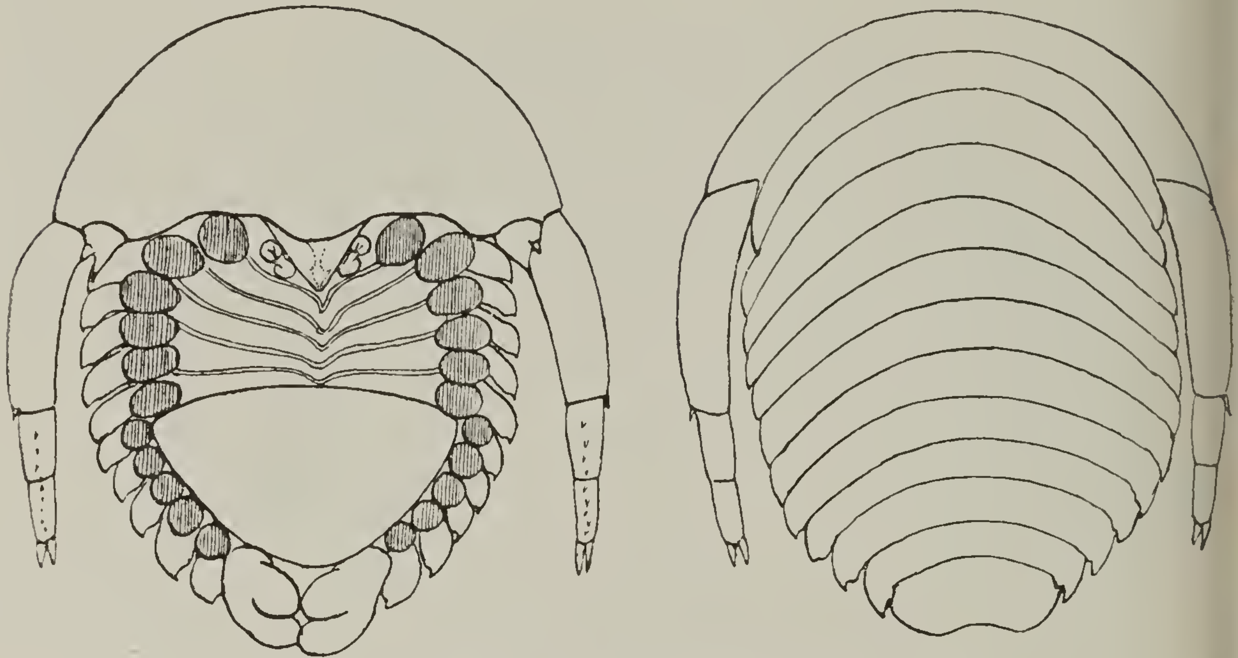


Fig. 19. *Holophryxus Acanthephyræ*, larva.
Ventral and dorsal view. The pereiopoda and pleopoda are removed (the shaded parts).

apically acuminated and with a spine on the outerside. 2nd antenna is about as long as the body, three-articulated, and has some small spines (see the fig.). Through the oral cone the mandibles are visible. At each side of the oral cone a gnathopod is seen of about the same form as the pereiopoda of the adult animal. Gnathopoda of this form are to be found in the Cryptoniscian-stages of the Dajidæ, but they are never found in other larvæ of Dajidæ of the stage figured this does not prove that they do not exist in the other known larvæ, but they are, even with the excellent preparation made by

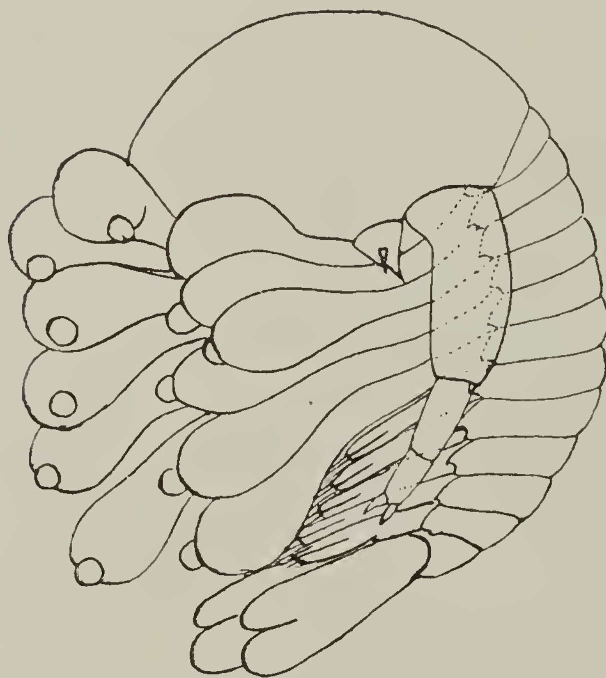


Fig. 20. *Holophryxus Acanthephyræ*, larva. Lateral view a little from below.

Prof. Jungersen, very difficult to see. — The ventral surface has 6 lamellæ (one for each of the 6 pairs of pereiopoda) and a large scutum (on the abdomen). The pereiopoda are thick and apparently immobile; on the innerside close to the tip they have a little bud-like process. When made transparent the pereiopoda of the next larval stage are to be seen through the skin, and within the bud-like process a claw is seen, quite as in the adult animal (fig. 21). There are 5 pairs of cleft pleopoda; they have a constriction about midway and are perhaps 2-articulated; but the articulation is not distinct. They have rather long natatory setæ. The uropoda are cleft, unarticulated and have no setæ.



Fig. 21. *Holophryxus Acanthephyræ*, larva. A pereiopod.

It has been found unnecessary to give a longer description, all details being seen from the figs.

Larvæ of a Decapod (Pandalus propinquus?) (figs. 22—31).

(St. 30b) 63° 04′ N, 56° 32′ W, 70 m. wire, 7—6—1908, ca. 15 spec. (1. and 2. stage).
(St. 37b) 63° 47′ N, 52° 12′ W, 100 m. wire, 9—6—1908, 2 spec. (2. stage).
(St. 229) 64° 20′ N, 53° 03′ W, 120, 100 and 80 m. wire, 29—8—1908, ca. 10 spec. (5. stage).
(St. 423) 65° 03′ N, 54° 16′ W, 120, 100 and 80 m. wire, 7—6—1909, ca. 60 spec. (25 spec. 2. stage, 35 spec. 3. stage).
(St. 196d) 68° 40′ N, 53° 12′ W, 350 m. wire, 17—8—1908, ca. 40 spec. (4. stage).
(St. 124) 69° 17′ N, 52° 14′ W, 150 m. wire, 16—7—1908, ca. 25 spec. (2. and 3. stage).

1.st (known) larval stage (figs. 22—30, st. I).

The total length 7 mm.

The body is very slender. The carapace inclusive of the rostrum is about one third as long as the total length. Rostrum is half as long as the carapace; it is slender and spiniform, without any denticles. In the middle of the dorsal surface of the carapace there is a little blunt prominence; the antero-lateral corners are apically pointed. The posterior division of the body has 6 seg-

ments and gradually tapers distally. The abdominal segments have no dentition exclusive of telson. Telson has the usual form and

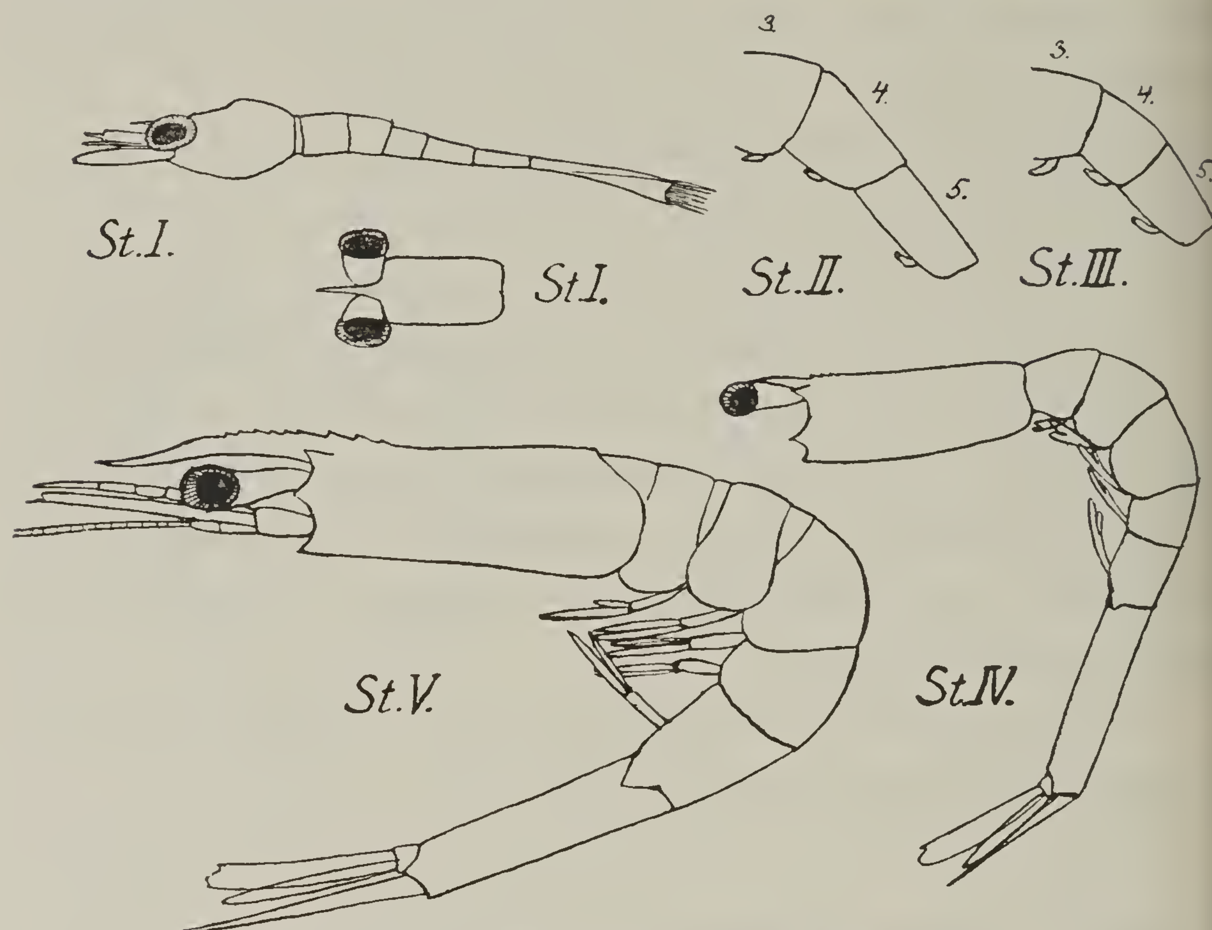


Fig. 22. The larva of *Pandalus propinquus* (?) stage 1—5.

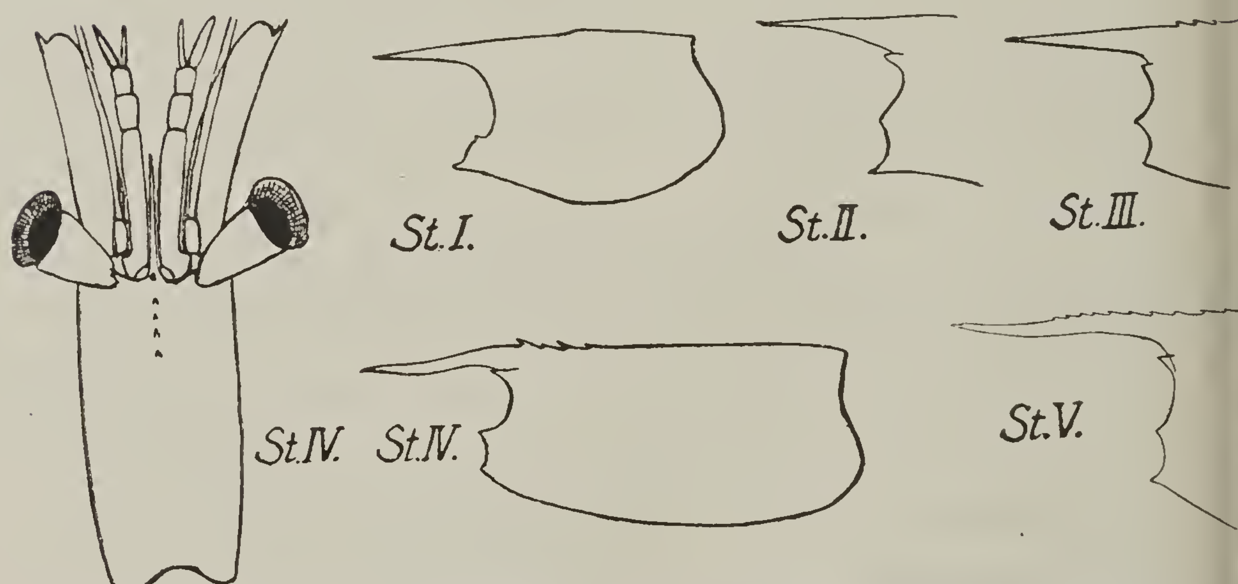


Fig. 23. The larva of *Pandalus propinquus* (?): carapace of stage 1—5.

is deeply emarginated at the hind edge with the usual 7 pairs of spines; all the spines are somewhat broken apically. Through the skin the incipient formation of the uropoda may be seen.

The eyes are somewhat applanated; they surpass somewhat the sides of the carapace.

All the appendages exclusive of the pleopoda and uropoda are present. The 1st and 2nd antennæ have about the same form as in the 1st larval stage of *Pandalus borealis* (G. O. Sars: Account of the postembryonal development of *Pandalus borealis* . . . .; Report

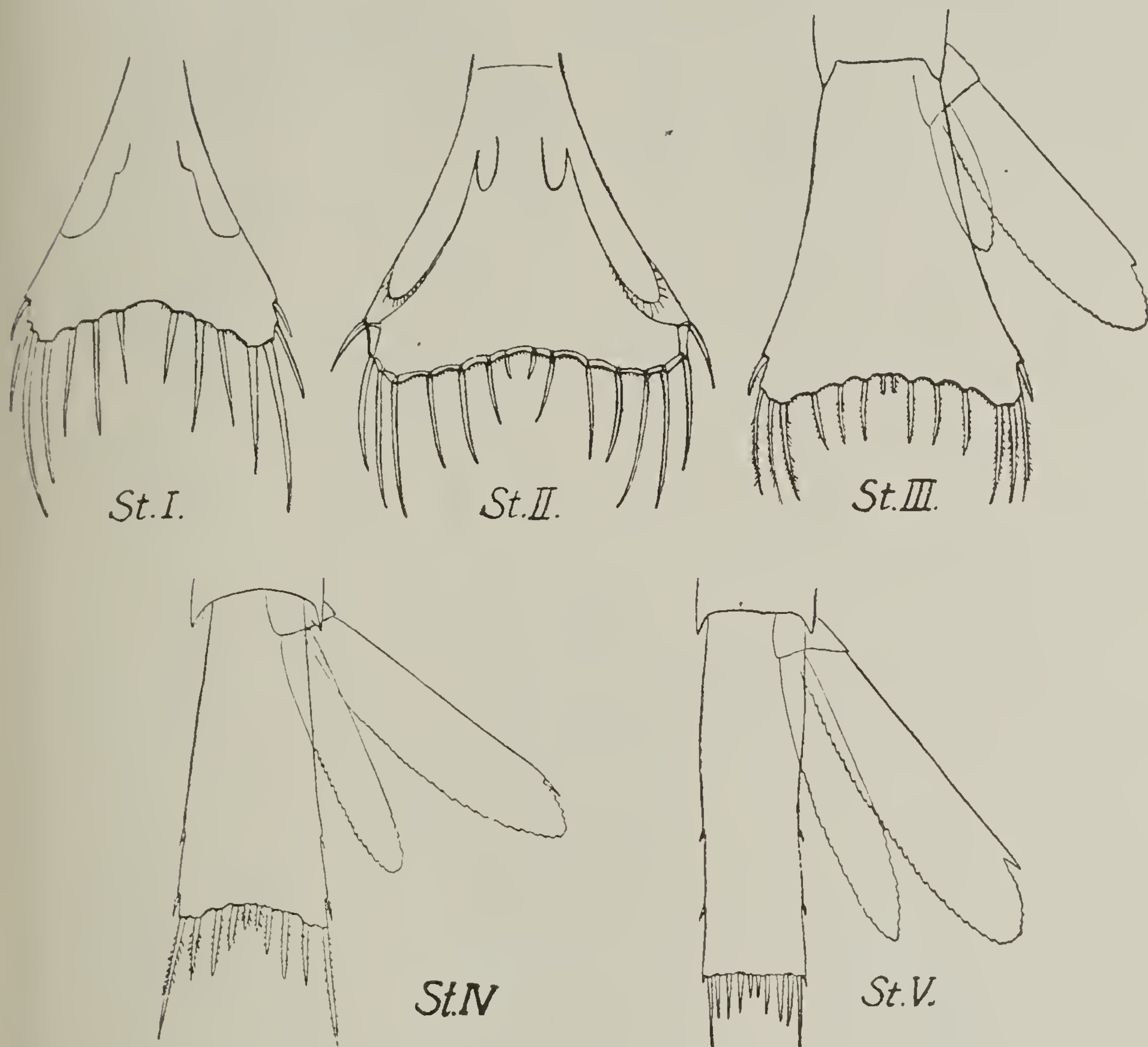


Fig. 24. The larva of *Pandalus propinquus (?)*: telson and uropoda of stage 1—5.

on Norwegian Fishery- and Marine-Investigations, vol. 1, 1900, No. 3, Pl. 1, figs. 3—4); the most important difference is that the stem of 1st antenna has a little joint apically. Also the mandibles and the maxillæ have about the same form (Sars l. c., Pl. 1, figs. 6—7); through the skin the mandibles and 2nd maxillæ of the next stage may be seen. The same agreement will be found in regard to 1st and 2nd maxilliped (Sars l. c. figs. 10—12); but 3rd maxilliped has the usual form and is not dilated as in *Pandalus borealis* (Sars l. c. fig. 12); besides it has 7 joints. (1. stage

of *P. borealis* has but 4 joints). The greatest difference, however, obtains in regard to the pereiopods. All the pereiopods are rather

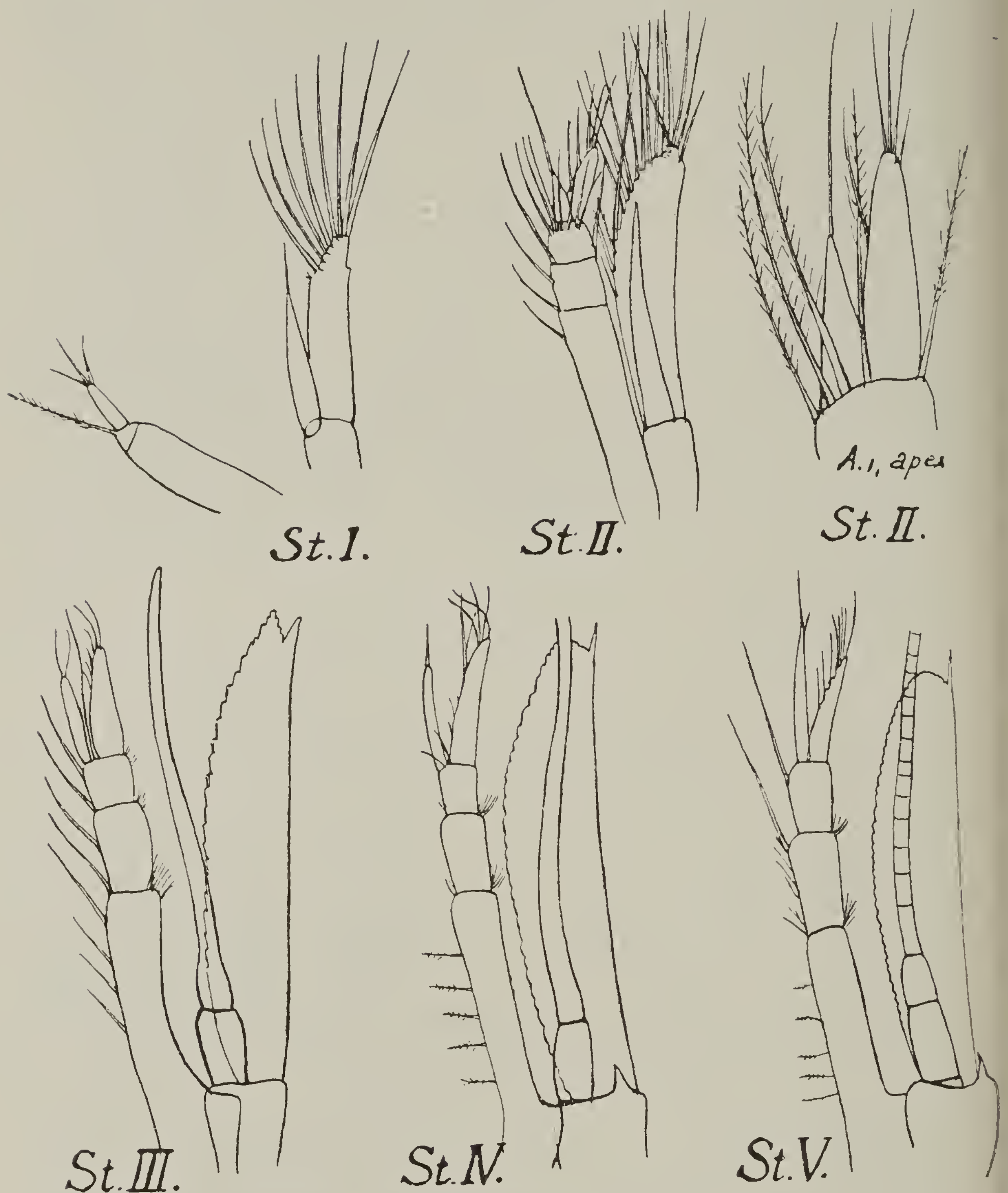


Fig. 25. The larva of *Pandalus propinquus (?)*: antenna 1—2 of stage 1—5.

large; 1st to 3d pairs are deeply cleft, 4th and 5th pairs have only the endopodite.

Pandalus borealis has no known larval stage totally corresponding with the 1st stage of the larva from the "Tjalfe"; stage 2 (Sars l. c. Pl. 2, figs. 1—3) is the best corresponding, but it has

no traces of 3rd to 5th pereiopod, and 2nd pereiopod is but a little, bud-like body.

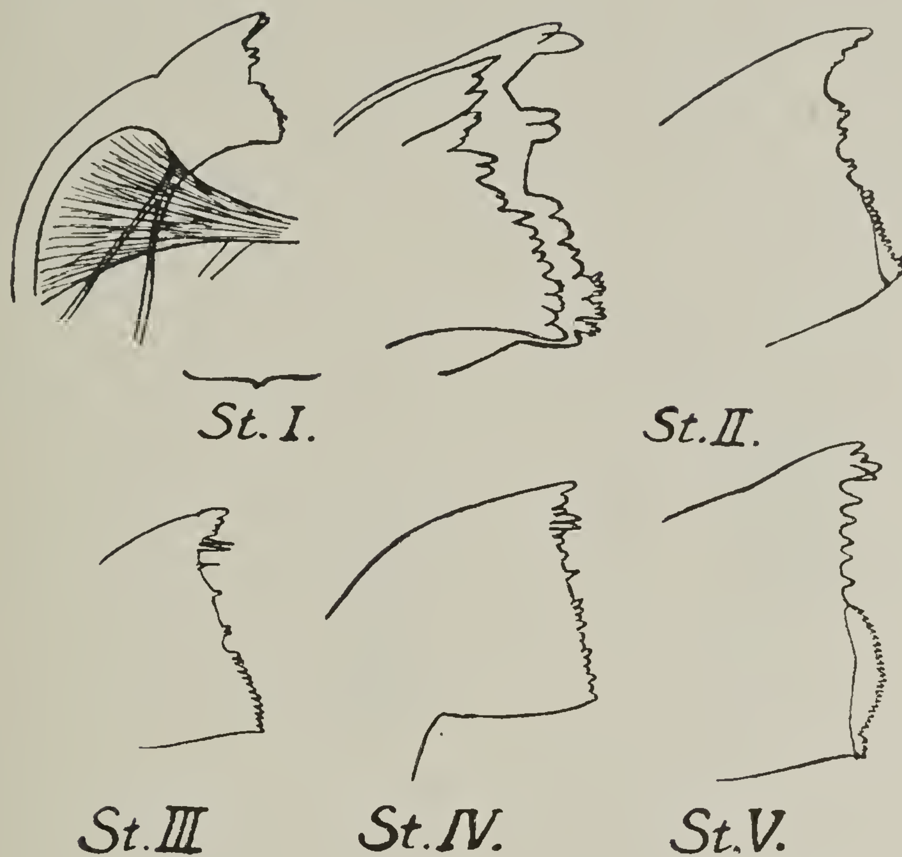


Fig. 26. The larva of *Pandalus propinquus (?):* the mandible of stage 1—5.

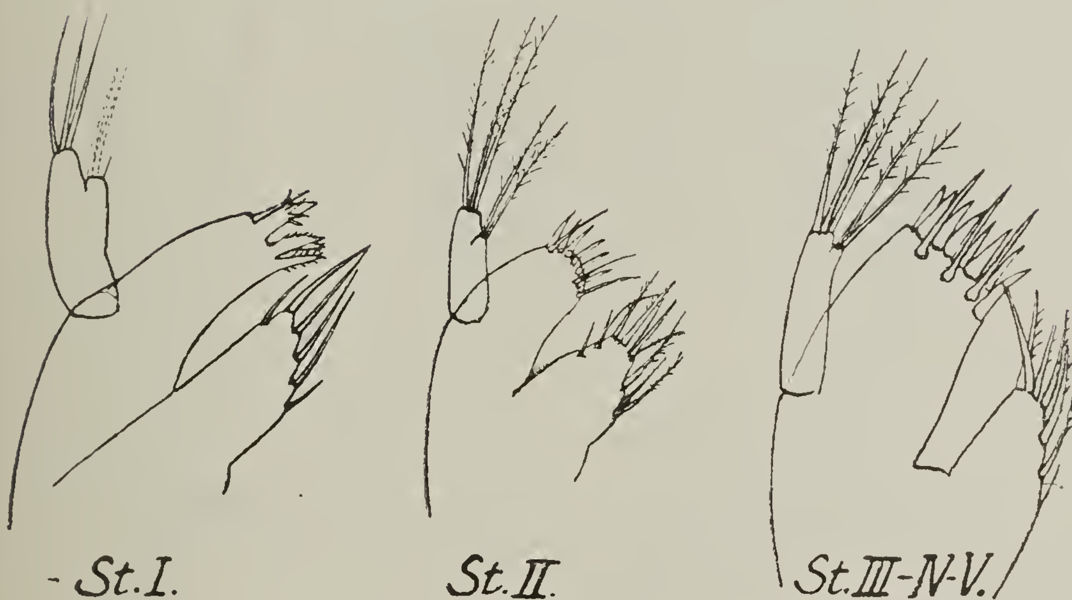


Fig. 27. The larva of *Pandalus propinquus (?):* 1. max. of stage 1—5.

2nd (known) larval stage (figs. 22—30, st. II).
Total length 9 mm.

The carapace has obtained one supra-ocular tooth. Through the larval skin the incipient formation of the articulation between the

6th abdominal segment and the telson may be seen as also the now cleft uropoda. The telson has now 8 pairs of spines.

The 1st antenna has acquired 3 joints in the stem. The oral parts are about as in the 1st stage; but 1st—3rd pereiopod have now all the usual 7 joints (in the 1st stage they are un-

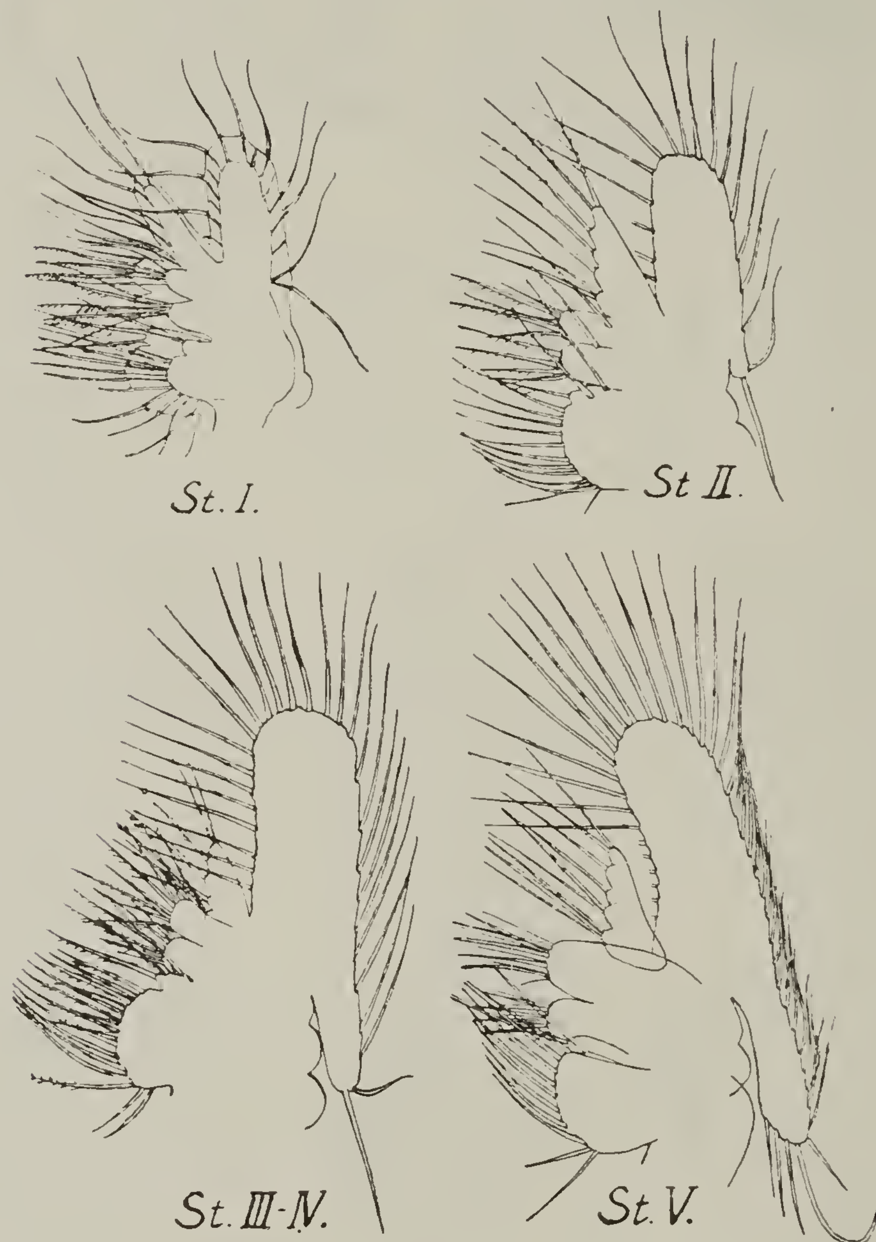


Fig. 28. The larva of *Pandalus propinpuus (?):* 2. max. of stage 1—5.

articulated), and their exopodites have 9 pairs of setæ. Also 4th and 5th pereiopod are articulated; but the 5th pair has but 6 joints, and the articulation is very indistinct. The pleopods are little uncleft appendages.

3rd (known) larval stage (figs. 22—30, st. III). Total length 10 mm.

In the fore-part of the middle-line of the carapace there are 3 little teeth; but they are not to be found in all the specimens. 1st antenna is unaltered, but flagellum in 2nd antenna is longer than the squama, though this is considerably increased in length, and the peduncular part (of the flagellum) is well defined, but has only a single joint; the terminal part is still unarticulated. The oral parts are about unaltered. The pereiopods are somewhat lengthened; 2nd pair are now cheliform, and 5th pair have 7 distinct joints. Abdomen has 7 joints, and the uropoda are free.

4th (known) stage (figs. 22—31, st. IV).

Total length 12 mm.

The carapace has 4 teeth in the middle line. The 5th abdominal segment has a little tooth at each side of the hind edge. The telson is very much altered; it is in the distal part not much broader than in the forepart, and it has but 7 pairs of spines, the 2 pairs of which are placed at the side-edge.

The antennæ and the oral parts are about as in the preceding stage; but in 2nd maxilla the exopodite is much more developed, especially its hinder lappet. The exopodites of the pereiopoda have 10 pairs of setæ, and the pereiopoda are somewhat lengthened in comparison with the preceding stage. The pleopoda are now cleft, but have a trace of articulation. The endopodites of the uropoda are about as long as the exopodites.

5th (known) stage (figs. 22—31, st. V).

Total length 19 mm.

The rostrum has 11 teeth, 1 of which is but a little from the tip and 3—4 on the carapace. The telson is about linear, has 8 pairs of spines, and is not emarginate at the tip.

In the 2nd antenna the peduncular part of the flagellum has 2 joints, and the flagellum itself is unarticulated, but is somewhat damaged in all the specimens. The oral parts are about as in the preceding stage. The pereiopoda are still more lengthened than in the 4th stage, and the 4th—5th pairs are very like the

same legs in the 1st postlarval stage in *Pandalus borealis* (Sars l. c., Pl. 1, fig. 1). The pleopoda are now articulated.

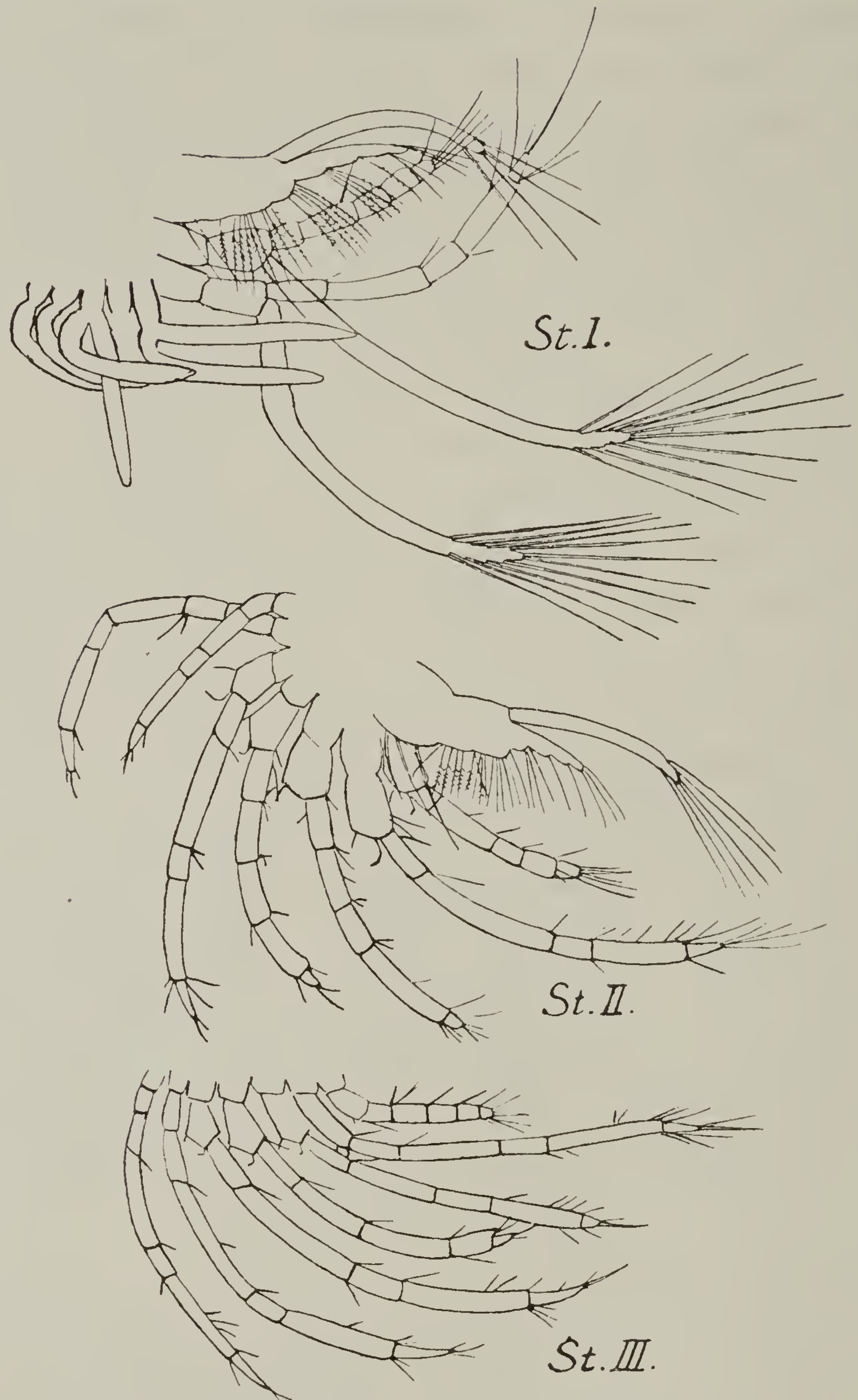


Fig. 29. The larva of *Pandalus propinquus (?)*: maxillipedes and pereiopoda of stage 1—3 (in st. 2—3 the exopodites are not drawn with exception of that in mxp. 1).

As may be seen, it is evident, that all the larvæ belong to one species.

From the rostrum and the 1st—2nd pereiopoda in the last

stage it may be concluded, that this species must belong to the fam. *Pandalidæ,* and this fam. has [in the Greenland seas but 3

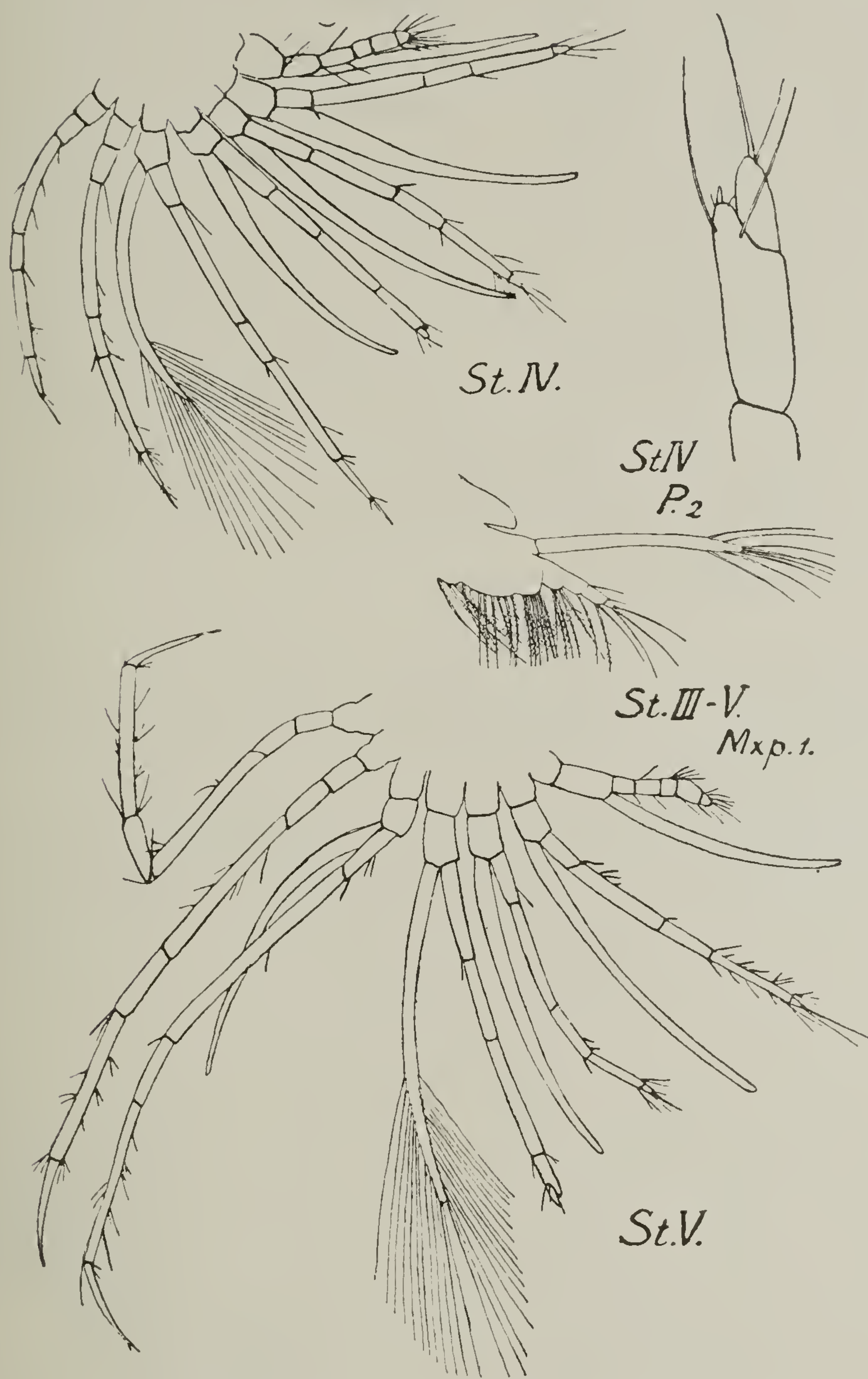


Fig. 30. The larva of *Pandalus propinquus (?):* maxillipedes and pereiopoda of stage 4—5.

species, viz. *Pandalus borealis, P. Montagui* and *P. propinquus.* The development of the two first-named species is described by G. O. Sars (l. c.); but the development of *P. propinquus* is quite unknown. When compared with the figs. given by Sars the agree-

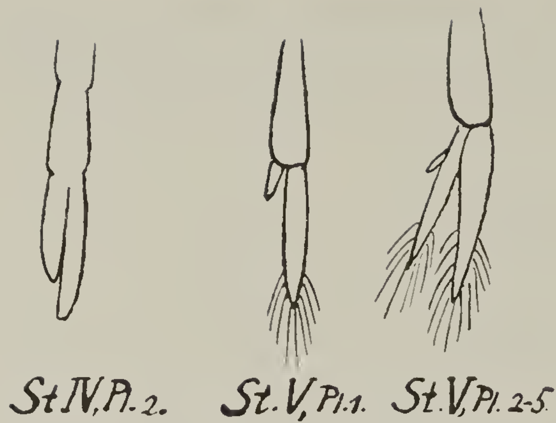


Fig. 31.
The larva of *Pandalus propinquus (?)*: Pleopods of st. 4—5.

ment with the larvæ from the "Tjalfe" is very distinct; the most important discrepancy is that the larvæ from the "Tjalfe" have no exopodite on the 4th pereiopod; *P. borealis* has this exopodite, but from Sars' description it seems, that *P. Montagui* and *P. (Pandalina) brevirostris* never acquire it. As, besides, *P. propinquus* has been taken in the deeper parts of the Davis Strait (by the "Ingolf" and the "Tjalfe"), it seems very probable that the larvæ must belong to this species.

Mysis-stage of a Decapod (Spirontocaris sp.?) (fig. 32).

(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—6—1909, 5 spec.

In "Report on the Malacostraca, Pycnogonida and some Entomostraca collected by the Danmark Expedition to North-East Green-

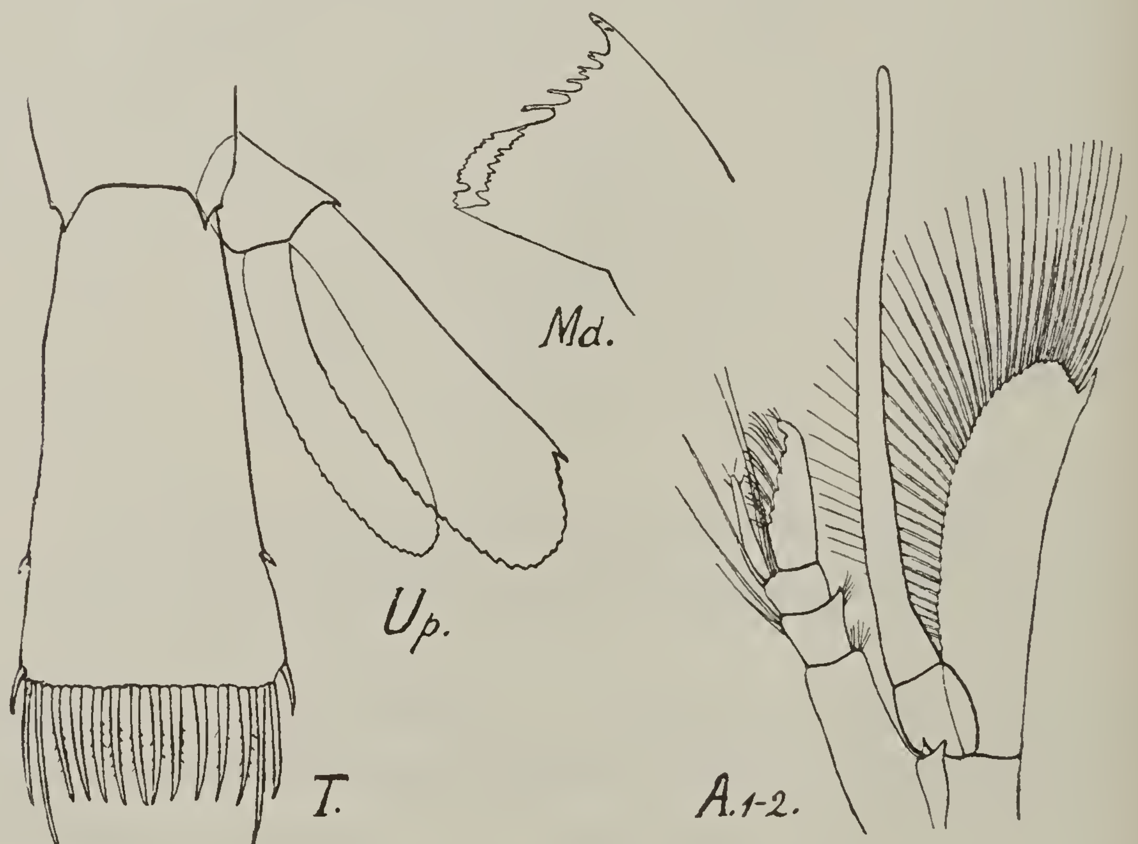


Fig. 32. Larva of *Spirontocaris sp. (?)*.

land", in „Meddelelser om Grønland", vol. 45, 1912, p. 522, Pl. 43, figs. 31—39, I have described a larva taken in Danmarks Havn (ca. 77° N, E. Greenland), 0—20 m., 19—9—1907.

Unfortunately the Danmark Expedition has taken but a single, badly preserved specimen. The specimens from the "Tjalfe" are better preserved and show, that the telson has a little spine at the hind corner. There is a little difference in regard to the mandibles, and the flagellum in the 2nd antenna has no trace of articulation; in all other regards the specimens from the "Tjalfe" fully correspond with that from the Danmark-Expedition. In the specimen figured the uropoda are somewhat shorter than the telson; in the other specimens they have the same length as the telson.

Brachyurid larva, 1st Zoea (fig. 33).

(St. 19a) 58° 41′ N, 49° 44′ W, 100 m. wire, 31—5—1908, 1 spec.
(St. 465) 62° 58′ N, 50° 52′ W, 25 fath., 21—6—1909, many spec. (1 cm.³).
(St. 464) The mouth of the Fiskenæsfjord, 80 m. wire, 21—6—1909, many spec. (50 cm.³).
(St. 30b) 63° 04′ N, 56° 32′ W, 70 m. wire, 7—6—1908, ca. 25 spec.
(St. 37b) 63° 47′ N, 52° 12′ W, 100 m. wire, 9—6—1908. many spec. (5 cm.³).
(St. 196d) 68° 40′ N, 53° 12′ W, 410 m., 350 m. wire, 17—8—1908, 1 spec.
(St. 124) 69° 17′ N, 52° 14′ W, 150 m. wire, 16—7—1908, many spec. (1 cm.³).
(St. 125) — — 550 m. wire, — 1 spec.

At the localities mentioned above the 1st Zoeastage of a crab was taken. The larvæ are in some points very like the larva of *Hyas araneus* (Williamson, Rep. on larval and later stages of certain decapod Crustacea: Fisheries, Scotland, Sci. Invest. 1909, 1. (Decbr. 1910), p. 13—15, Pl. 1, figs. 1—2; Pl. 5, figs. 70—78, 80—81). In other points they are very like the 1st Zoea of *Cancer pagurus* (J. Pearson, Cancer; Transact. Liverpool Biol. Soc., vol. 22, 1908 p. 461, Pl. 13, figs. 85—87); the appendages are in about the same stage of development, and the telson has about the same form and the same number of spines: but the lateral spines of the carapace of the larvæ from the "Tjalfe" are longer, and on the abdominal segments there are lateral spines as in the larvæ of

Hyas araneus (see above) and as in the last zoea-stage of the American species *Cancer irroratus* (S. I. Smith, Metamorph. of lobster and other crust.; U. S. Commission of Fish and Fisheries 1871—72 (1873), p. 530, Pl. 8, fig. 37). Smith does not give

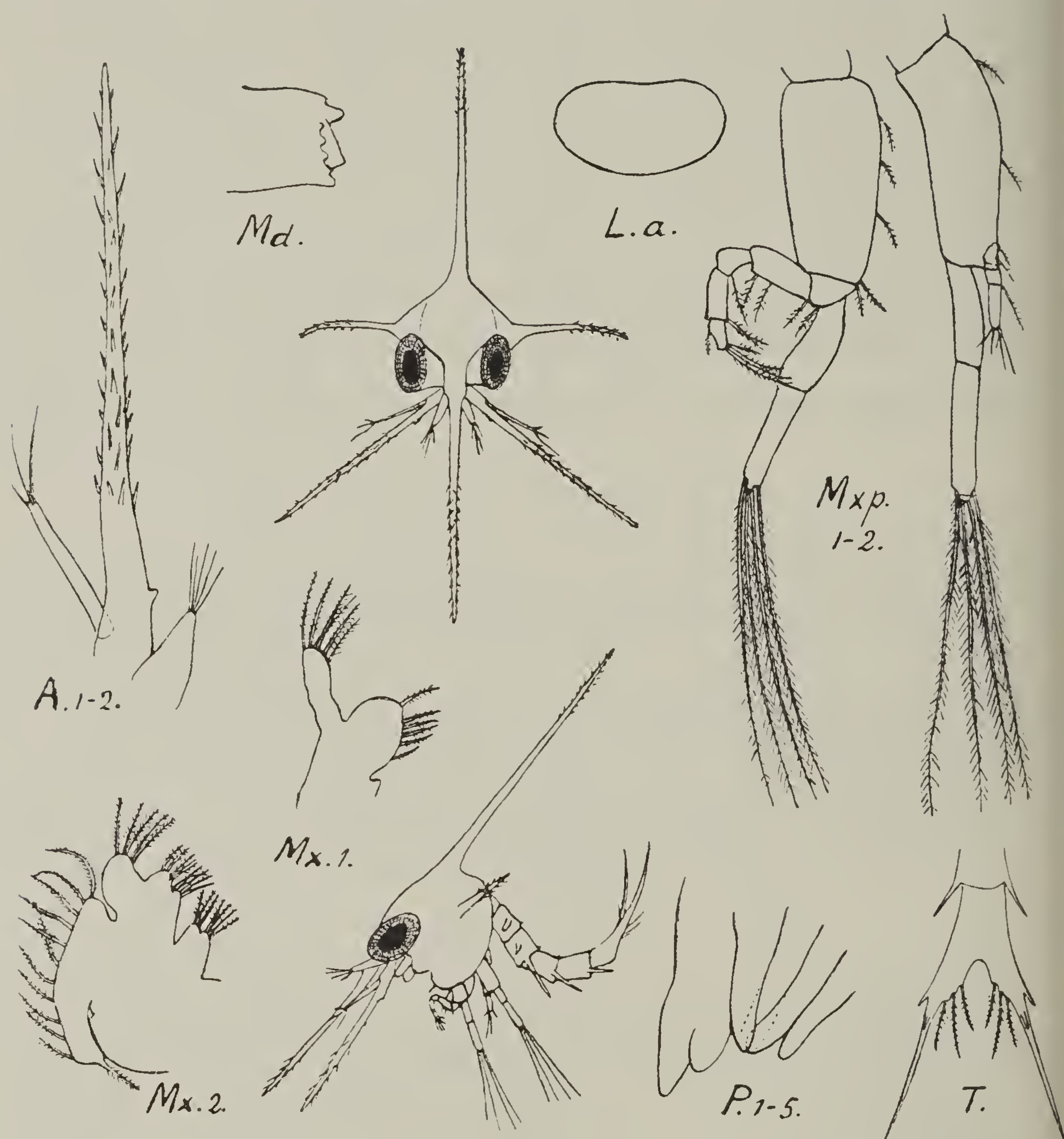


Fig. 33. *Brachyurid*-larva (L. a. = labrum).

any detailed description or fig. of the 1st Zoea; but the existence of a pair of dorsal spines on the 5th abdominal segment in his fig. seems to be the sole discrepancy not due to the difference in age. —

Description of the larva.

The length between the tips of the rostrum and of the dorsal spine 2 mm. The rostrum is about twice as long as the carapace

without spines; the dorsal spine is somewhat longer than the rostrum and about twice as long as the lateral spines. All the 4 spines on the carapace are almost straight and are in the distal part furnished with setæ. The carapace is somewhat globular; at the forepart of the under-edge there is at each side a rather deep incision behind which 4 setæ are fixed. The eyes are very large and have black pigment; nowhere else is pigment to be seen.

Antenna 1 is an unarticulated conical appendage with 5 (?) long setæ; but the number of these is difficult to determine as they most frequently lie close to one another. Antenna 2 is unarticulated; the exopodite is between 3 and 4 times as long as the endopodite, which has 3 setæ on the tip. A little distally to the place where the endopodite is fixed, but on the other side, the exopodite has a little prominence; for the rest it is furnished with small setæ like those on the spines of the carapace. The labrum has the usual form. The mandibles have no palp; the form of the mastigatory part may be seen from the fig.; but the 4 little rounded teeth are in several of the specimens not to be found. Maxilla 1 has no palp, but has the usual 3 lobes; the 1st lobe, the basal lobe, is rather broad, with 6 short, ciliated setæ; the mastigatory lobe is longer and narrower and has 6 setæ somewhat longer than those of the basal lobe. Maxilla 2 has the usual form with a large exopodite; palp and endopodite have 2 cleft lobes. In the 1st pair of maxillipeds the endopodite has 5 joints; it is a little shorter than the two-articulated exopodite that has 4 long natatory setæ at the tip. Also in the 2nd maxilliped the exopodite has 2 joints and 4 natatory setæ, but the endopodite is short and has but 3 joints. There are no traces of the 3d maxilliped. The pereiopods are short unarticulated appendages; the 1st pair are cleft. Of the pleopoda and uropoda there are no traces, and abdomen has but 6 segments. On the middle of each side of 2nd and 3rd abdominal segment there is a spine that is large and curved and there are long straight lateral spines on the hind edges of 3rd, 4th and 5th abdominal segments. Two little

bristles are placed dorsally on each abdominal segment. The telson has the same number of spines and about the same form as Williamson's fig. of *Hyas araneus* (l. c. fig. 70), but the hook in the hind-edge is narrower, being rounded acute-angled.

Compared with the 1st zoea of *Cancer pagurus* the larva described above differs, besides in regard to the abdominal segments, also in some small details in the appendages. Greater is the agreement with 1st zoea of *Hyas araneus* (Williamson l. c., Pl. 5 fig. 73), especially in regard to the abdomen; but the greatest agreement seems to me to be with the larva of *Cancer irroratus*. If the larvæ from the "Tjalfe" really belong to *Cancer irroratus*, they have a very great interest; for the adult *Cancer irroratus* is never found at Greenland, but lives at the east coast of N. America. Of the mentioned crabs only *Hyas araneus* lives at Greenland.

Larva of Munida Bamffica Penn.

Munida rugosa G. O. Sars, Bidrag til Decapodernes Forvandling II, Archiv f. Mathematik og Naturvidenskab, Christiania 1889, p. 178, Pl. 6.

(St. 292) 58° 24′ N, 30° 35′ W, 500 m. wire, 3—10—1908, 1 spec.

The larva belongs to the stage drawn by Sars (l. c.) fig. 12.

Larvæ of Munida (tenuimana G. O. Sars?) (figs. 34—36).

(St. 281) 57° 51′ N, 43° 57′ W, 500 m. wire, 29—9—1908, 3 spec.
(St. 285) 57° 51′ N, 43° 48′ W, 1000 m. wire, 29—9—1908, 2 spec.
(St. 278) 58° 16′ N, 47° 12′ W, 80—200 m. wire, 28—9—1908, 3 spec.
(St. 292) 58° 24′ N, 30° 35′ W, 500 m. wire, 3—10—1908, 1 spec.

At the stations above the "Tjalfe" has taken some larvæ belonging to a species of *Munida*. Some of the specimens belong to a stage between the stages figured by Sars (*Munida rugosa* l. c. 1889), some of them to a stage corresponding to the older of Sars's larvæ; the younger larvæ have no traces of pleopoda and are 11 mm. long (incl. rostrum), the older 14 mm. As my figures will show, there is in most regards a very good agreement with

Sars' figures; but I have not been able to find the two little teeth on the dorsal surface of the abdominal segments in spite of very close examination. In the specimen figured of the older larva the hinder lateral corners of the carapace reach to the hind-edge

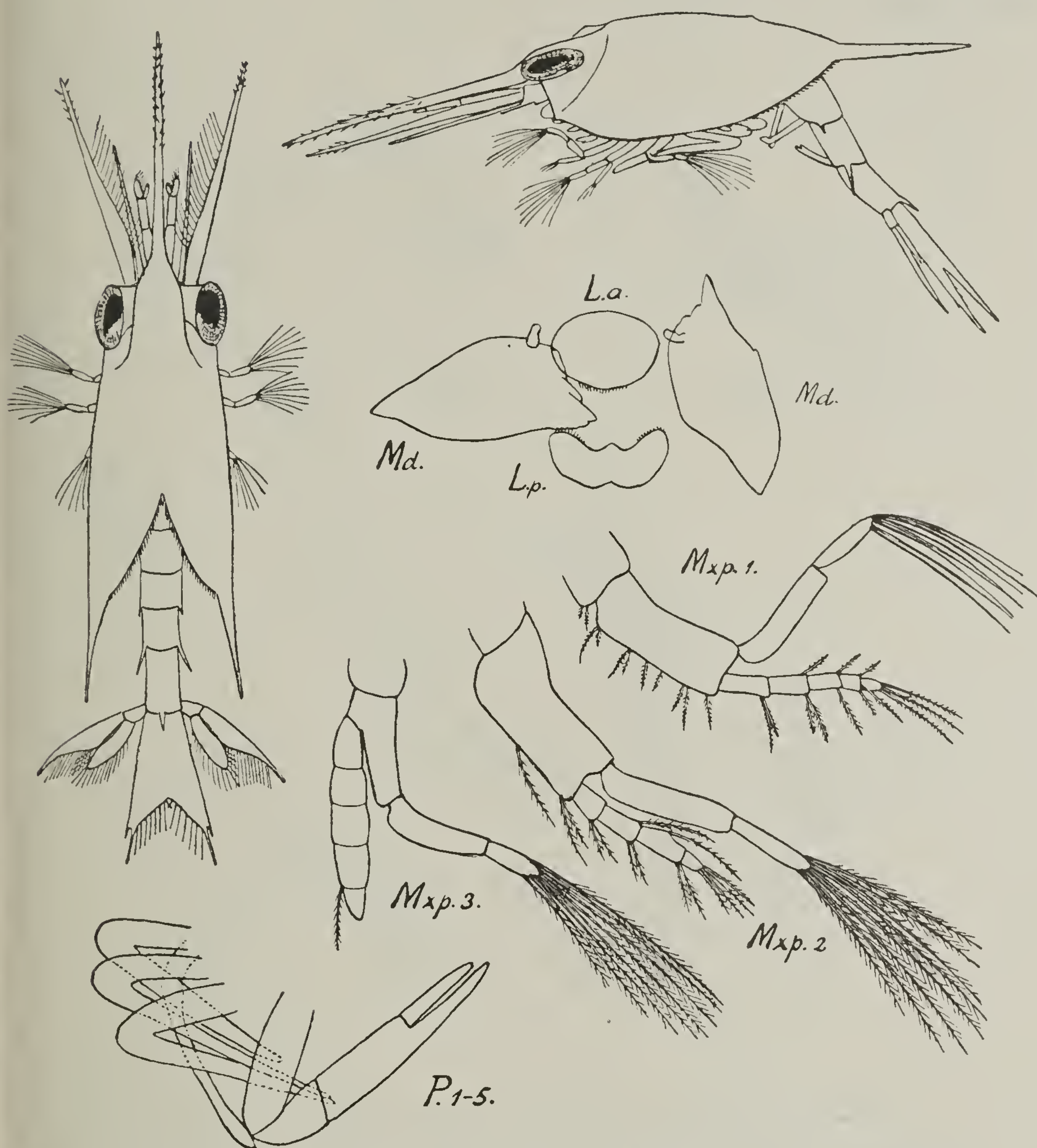


Fig. 34. Larva of *Munida (tenuimana?)*, older stage.

of the 6th abdominal segment; in the other specimens they are as long as in the specimens drawn by Sars. But in all the specimens the exterior spine on the corner of the telson is relatively much longer than in the species described by Sars; as this difference fully corresponds with the specific character in the genus *Galathea* (Sars l. c., p. 174, Pl. 5, fig. 3, 15, 26; — the specific character

in the squama of the genus *Galathea* [Sars l. c., p. 173, Pl. 5, fig, 3, 6, 19] is not to be found in the genus *Munida*, the squama in all stages and in both species having about the same form—), I find reason to believe, that these specimens belong to another species than that described by Sars.



Fig. 35. Larva of *Munida (tenuimana?)* older stage.
The telson has in the specimen figured 7 setæ in the right side of the hook, 8 in the left side.

During a cruise in the summer 1911 has with the Danish Fisheries-investigation-steamer "Thor" in the Skagerak (57° 09′ N, 7° 16′ E, 25 miles NNW. ½ W. to the light house Lodbjerg, 44 m.) Dr. Th. Mortensen collected a large number of larvæ of *Munida*, and about all these larvæ totally correspond with the younger larvæ from the "Tjalfe" (the other larvæ belong to *M. Bamffica). M. tenuimana*

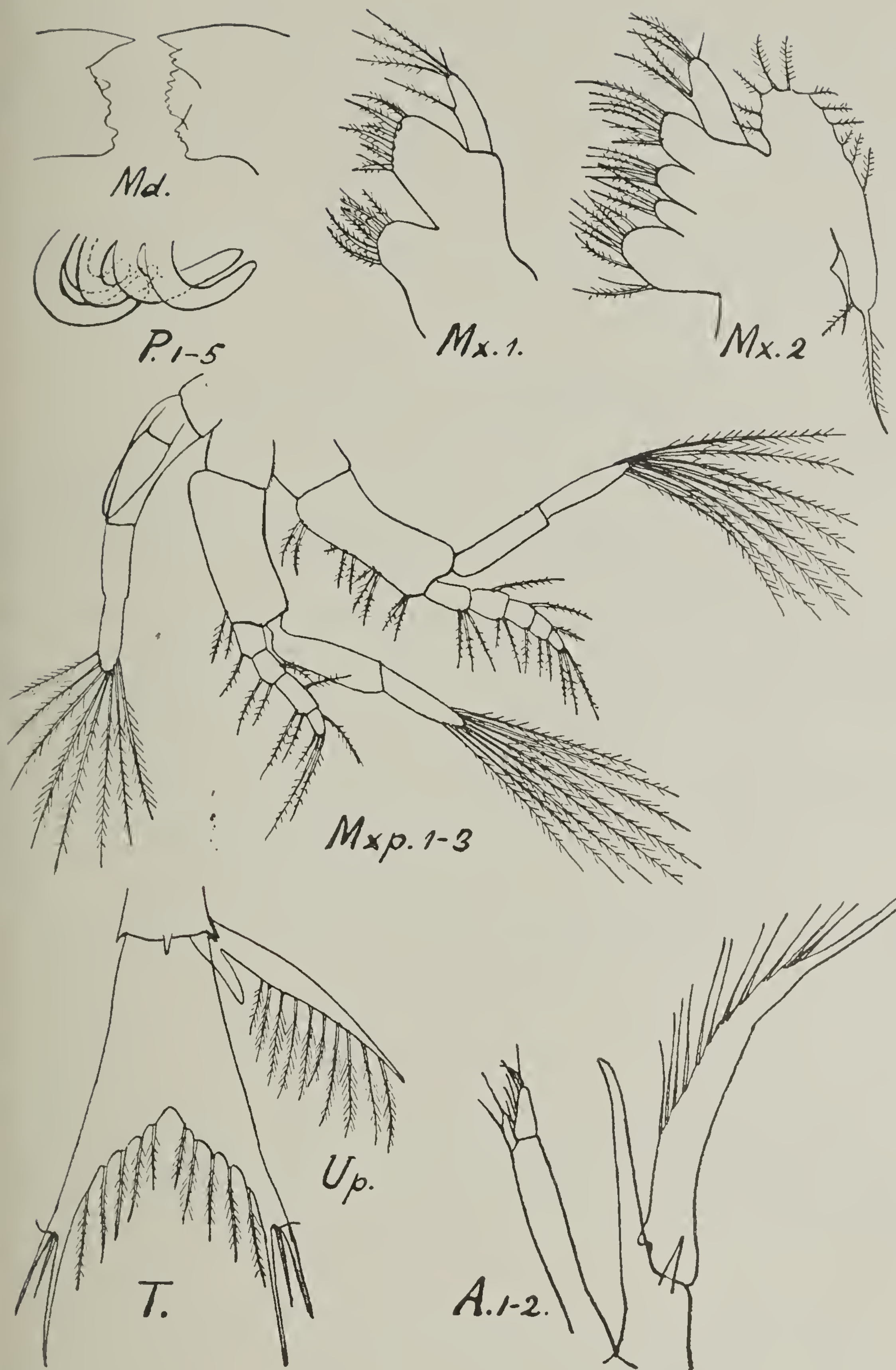


Fig. 36. Larva of *Munida (tenuimana?)* younger stage.
All the figs. are from specimens from the Skagerak except the fig. of A. 1—2 (from a specimen from the "Tjalfe").

being very common in the Skagerak, whilst *M. Bamffica* is seldom (of the latter species the Danish Fisheries-investigation-steamer "Thor" has taken but a single specimen, see my paper: Revideret

Fortegnelse over Danmarks marine Decapoda, Vidensk. Meddel. Naturh. Foren. København 1909 (1910), p. 274), and as we have only the two named species in the Skagerak, I mean, that also the larvæ from the "Tjalfe" belong to *Munida tenuimana*.

Abbreviations of literature.

Bell 1853, = Bell, *British stalk-eyed Crustacea*. 1853.

H. J. Hansen, V. Grønland = H. J. Hansen, *Malacostraca marina Groenlandiæ occidentalis*. Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr; Vid. Meddel. Naturh. Foren. Kjbhv. 1887.

H. J. Hansen, Ingolf = H. J. Hansen, *Crustacea Malacostraca* I. The Danish "Ingolf"-Expedition, vol. 3, part 2, 1908.

Kemp, Decap. Ireland, 1908 (1910) = Kemp, *Decapoda Natantia* of the coasts of Ireland. Fisheries, Ireland, Sci. Invest. 1908, I. (1910).

Ohlin 1901 = Ohlin, *Arctic Crustacea* collected during the Swedish arctic exped. 1898—1899, II. Decap., Schizop.; Bihang K. Svenska Vet. Akads. Handl., vol. 27, Afd. 4, 1901.

Stebbing, Tierreich = Stebbing, *Amphipoda I, Gammaridea;* Das Tierreich, Lief. 21, 1906.

All the figures are from drawings by the author except fig. 13 (photograph).

20—5—1912.

Some small Leptocephalids from the Atlantic.

By

Cand. mag. ***H. Blegvad.***

During my time of service onboard H. M. S. „Ingolf" on a cruise to the Danish West-Indies in the winter of 1910—11, I was enabled, by the generosity of the Royal Navy department, to undertake pelagic hauls with a plankton-net on the way from Europe to the West-Indies and back.

The main purpose was to examine the distribution of the larvæ of Echinoderms, and the material of this kind collected will be dealt with by Dr. Th. Mortensen.

In addition, although the plankton-net measured only 1/2 meter in diameter, and each haul lasted only about 10 minutes, I caught at several places in the Atlantic Ocean some Leptocephalids or larvae of Murænoids. Three of these — though I do not venture at present to point out their relations to distinct species of Murænoids — are of special interest, inter alia on account of their small size. I give here therefore figures and a short description of these 3 Leptocephalids.

I. The smallest one, which has a length of 19.8 mm., was caught the 14th of November 1910 at 4 o'clock a. m. at the surface of the sea at 21° 34′ lat. N., 29° 50′ long. W. According to the kind communication of Dr. Johs. Schmidt, who has examined this Leptocephalid, it represents a species hitherto undescribed; I propose to name it in honour of Dr. Joh. Hjort, who was the first to find young Leptocephalids of *Anguilla vulgaris* South of the Azores.

Leptocephalus Hjorti n. sp.

Fig. 1 is a photograph in $^{5}/_{3}$ times enlargement. Fig. 2, which represents the same specimen, drawn with prism, shows the extension of the pigment. This consists of apparently black, but in reality brown, mostly branched chromatophores, which chiefly follow the chorda and the upper margin of the alimentary canal, as shown in the figure.

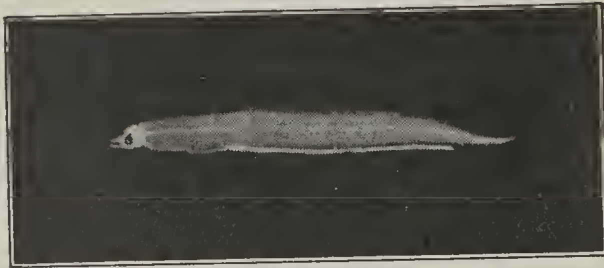


Fig. 1. 5 : 3.

On two places only, at a distance of respectively 6 and 11 mm from the point of the snout, there are great, branched chromatophores on the under side of the alimentary canal. At the tip of

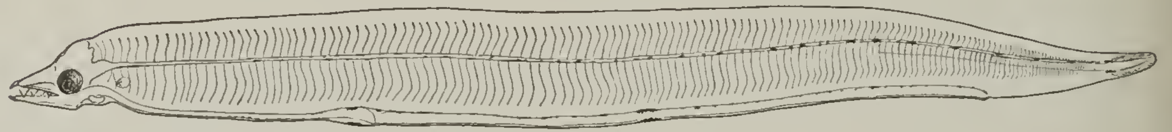


Fig. 2. ca. 5 : 1.

the tail the chromatophores form a continuous row above and below along the base of the tail fin. For the rest the form of the body is — as in other Leptocephalids — very strongly compressed. The vertical fins are little developed; in the extreme part of the tail fin only embryonic fin rays are to be seen. Interspinal elements are still wanting. The pectoral fins are nearly rudimentary. Fig. 3 shows the head; the lower jaw is more projecting than the upper, which has 6 forward pointing teeth on each side; the hindmost tooth is very small (not shown in the figure). In the lower jaw only 5 projecting teeth are seen on each side. All the teeth are long, straight and pointed, except the 2 foremost in the upper and lower jaw; these have namely a slight curvature at the

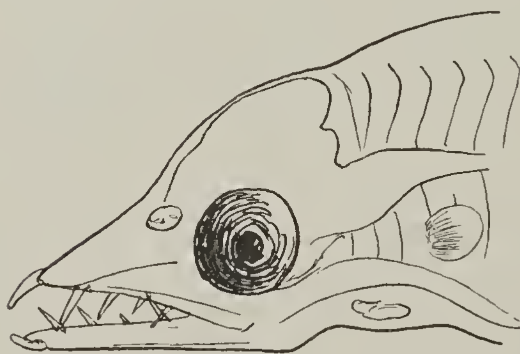


Fig. 3. 17 : 1.

base and are fastened, as figured, repectively outermost at the upper side of the upper jaw and outermost at the underside of the lower jaw.

The number of segments (myomeres) is about 182, or about 113 præanal and 69 postanal segments.

The greatest height of the body is	2,3	mm.
Distance from the point of the snout to anus	16,75	—
Length of the head.	1,3	—
Distance from the point of the snout to the anterior margin of the eye	0,8	—
Diameter of the eye.	0,4	—

II. Fig. 4 is a photograph of the next smallest Leptocephalid; its total length was 21,5 mm. This specimen was captured at the surface on 26° 45′ lat. N. 59° 35′ long. W. at 7 o'clock p. m. the 6th of March 1911. The body is compressed, the tail end tapering. Fig. 5 shows the distribution of the — very few — dark brown chromatophores on the tip of the tail. No pigment else is seen on the animal. The pectoral fins are small; embryonic fin rays are developed far forward in the vertical fins, but interspinalia are not yet visible. Fig. 6 represents the head with its powerfully developed teeth. The upper jaw has on each side 3 smaller teeth behind and 4 larger teeth in front. The lower jaw has on each side only 2 smaller and

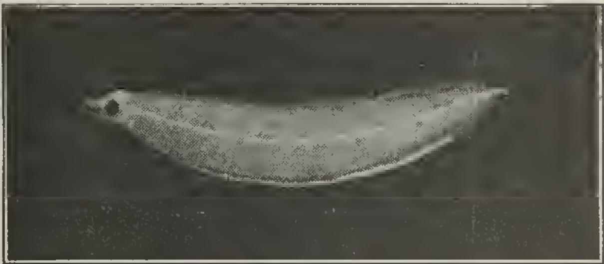


Fig. 4. 5 : 3.

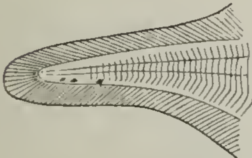


Fig. 5. 20 : 1.

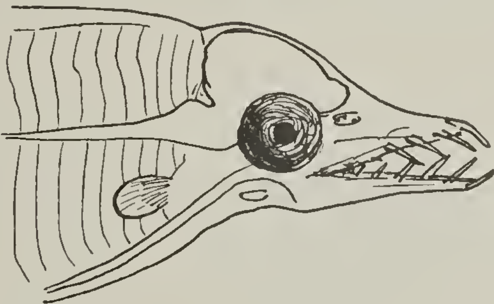


Fig. 6. 7 : 1.

4 larger teeth. All the teeth are projecting, the 2 foremost in the upper and lower jaw have a slight curvature and are, as was the case with the above mentioned specimen, fastened respectively at the upper side of the upper jaw and the underside of the lower jaw.

The number of segments is about 163 in all, or about 88 præanal and 75 postanal segments.

The greatest height of the body is	3,1	mm.
Distance from the point of the snout to anus	19,2	—
Length of the head	3,6	—
Distance from the point of the snout to the anterior margin of the eye	1,0	—
Diameter of the eye	0,7	—

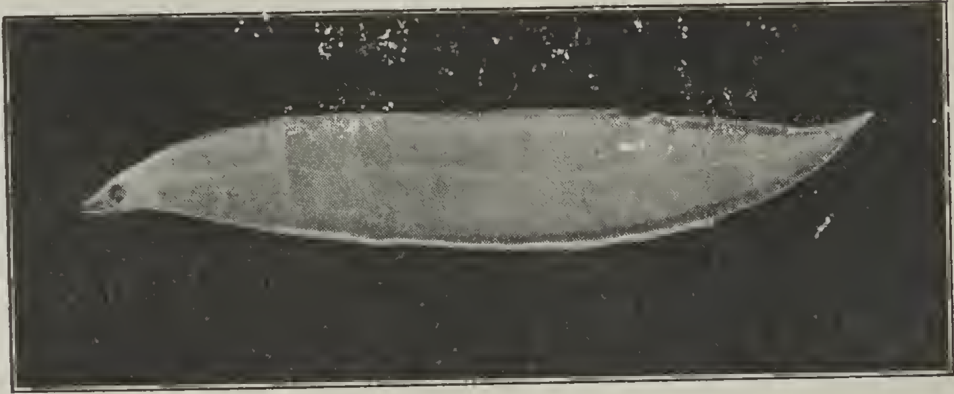


Fig. 7. 3:2.

III. The third Leptocephalid (Fig. 7), which has a total length of 42,5 mm., probably belongs to the same species as No. II, but

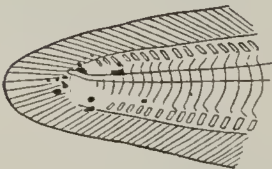


Fig. 8. 20:1.

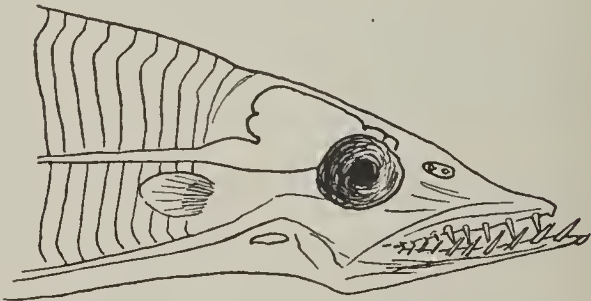


Fig. 9. 7:1.

represents an older stage of development. They were both caught at the same place and at the same time. The form of the body of specimen No. III is very similar to that of specimen No. II; the tail end only is not so pointed. Tho pigment is, as shown in fig. 8, a little more developed, but otherwise, quite as in specimen

No. II, confined to dark brown chromatophores on the tip of the tail. The pectoral fins still have embryonic fin rays, which is also the case in the vertical fins, but distinct interspinal elements are now developed to the number of about 112 in the anal fin and about 140 in the dorsal fin; (damage of the fins caused some difficulty in the exact counting of the interspinalia).

Fig. 9 represents the head, which is not so distinctly marked from the body and has a more depressed form than in the above mentioned specimen. In the upper jaw there are 4 smaller and 8 larger teeth on each side, but the foremost tooth, which has a slight curvature at the base and is fastened outermost at the upper side of the upper jaw, was broken and is not figured. The lower jaw has 3 smaller and 8 larger teeth on each side. For the rest the teeth are exactly as those mentioned above.

The number of segments is about 91 præanal and 67 post-anal, or about 158 in all.

The greatest height of the body is	7,1	mm.
Distance from the point of the snout to anus........	34,0	—
Length of the head	3,3	—
Distance from the point of the snout to the anterior margin of the eye	1,8	—
Diameter of the eye	0,8	—

In „Leptocephalids in the University zoological museum of Upsala“ by Dr. Pehr Strömman, a species is described under the name *Leptocephalus lanceolatus*, which agrees in several regards with my specimens Nos. II and III; unfortunately the number of segments is not indicated. Meantime Dr. Johs. Schmidt in his recently published „Contributions to the biology of some North Atlantic species of Eels“ (Vidensk. Medd. Naturh. Forening København, Vol. 64. 1912), after having examined the type specimens of this species, gives the number of myomeres as ca. 160, of which about 88 pre-anal. After this it can scarcely be doubted that my specimens Nr. II and III are really this species.

It is stated that pigment is quite absent in Dr. Strømman's *Leptocephalus lanceolatus*, but this can be caused, without doubt, by an insufficient preservation.

I am indebted to Docent R. H. Stamm for his assistance in photographing the Leptocephalids, and to the Officers of the „Ingolf“ for their kind help onboard; in particular I would thank the Captain of the ship, Commander C. V. E. Carstensen, and Lieutenant Godfred Hansen for their kindness and interest in my work during the whole voyage.



19–7–1912.

Fuglene ved de danske Fyr i 1911.

29de Aarsberetning om danske Fugle.

Ved

R. Hørring.

Med et Kort.

I 1911 indsendtes fra 32 af de danske Fyr til Universitetets zoologiske Museum 923 Fugle af 68 Arter faldne om Natten i Træktiderne. Sikker Efterretning haves om 2117 artsbestemte faldne Fugle, idet Prøver af disse ere indsendte. Ifølge Fyrmestrenes Opgivelser er endyderligere opsamlet c. 855 faldne Fugle, hvoraf c. 510 vare Drosler. Nøjere Efterretning haves saaledes om c. 3000 Fugles Død ved Fyrene. Endelig meldes fra Fyrskibene, at overmaade mange Fugle ere faldne i Søen efter at være dræbte ved Fyrruderne. I det hele er der sikkert faldet mindst 4000 Fugle.

De Fyr, hvorfra Fugle indsendtes, vare: *Graadyb* Fyrskib, J. S. Ibsen Fyrskibsfører (42 Fugle fra 20 Nætter); *Vyl* Fyrskib, J. S. Jensen Fyrskibsfører (85 Fugle fra 35 Nætter); *Horns Rev* Fyrskib, H. Sonnichsen Fyrskibsfører (29 Fugle fra 4 Nætter); *Lyngvig* Fyr, P. A. Larsen Fyrmester (50 Fugle fra 26 Nætter); *Lodbjerg* Fyr, P. S. Pedersen Fyrmester (48 Fugle fra 8 Nætter); *Hanstholm* Fyr, H. Roed Fyrmester (15 Fugle fra 3 Nætter); *Rubjerg Knude* Fyr, J. C. Boysen Fyrmester (28 Fugle fra 2 Nætter); *Hirtshals* Fyr, H. Hinrichsen Fyrmester (11 Fugle fra 1 Nat); *Skagen* Fyr, G. H. E. Wielandt Fyrmester (39 Fugle fra 6 Nætter); *Læsø Trindel* Fyrskib, P. V. Eriksen Fyrskibsfører (50 Fugle

1911.)
fra 14 Nætter); *Læsø Rende* Fyrskib, P. C. Grumsen Fyrskibsfører (40 Fugle fra 13 Nætter); *Østre Flak* Fyrskib, N. C. Knudsen Fyrskibsfører (83 Fugle fra 23 Nætter); *Anholt Knob* Fyrskib, T. A. M. Andresen Fyrskibsfører (38 Fugle fra 23 Nætter); *Anholt* Fyr, J. P. Nielsen Fyrmester (102 Fugle fra 7 Nætter); *Schultz's Grund* Fyrskib, P. Larsen Fyrskibsfører (78 Fugle fra 10 Nætter); *Fornæs* Fyr, A. Kruse Fyrmester (1 Fugl); *Hjelm* Fyr, A. P. Jensen Fyrmester (3 Fugle fra 1 Nat); *Thunø* Fyr, C. Kjeldsen Fyrpasser (2 Fugle fra 2 Nætter); *Sejrø* Fyr, N. J. Z. Nielsen Fyrmester (7 Fugle fra 2 Nætter); *Nakkehoved* Fyr, W. Schultz Fyrmester (2 Fugle fra 2 Nætter); *Lappegrunden* Fyrskib, J. C. Jensen Fyrskibsfører (1 Fugl); *Drogden* Fyrskib, N. J. Kromann Fyrskibsfører (2 Fugle fra 2 Nætter); *Stevns* Fyr, L. D. A. Wedén Fyrmester (31 Fugle fra 5 Nætter); *Sprogø* Fyr, A. V. Hansen Fyrmester (2 Fugle fra 2 Nætter); *Omø* Fyr, P. F. Køhler, Fyrmester (6 Fugle fra 3 Nætter); *Hov* Fyr, H. V. O. Westermann Fyrmester (2 Fugle fra 2 Nætter); *Kjels Nor* Fyr, J. C. Ryder Fyrmester (87 Fugle fra 12 Nætter); *Æbelø* Fyr, E. W. F. C. Schönfeldt Fyrmester (3 Fugle fra 2 Nætter); *Hammeren* Fyr, A. M. Dam Fyrmester (2 Fugle fra 2 Nætter); *Gedser* Fyr, P. A. C. Lindgaard Fyrmester (5 Fugle fra 4 Nætter); *Gedser Rev* Fyrskib, J. Jensen Fyrskibsfører (21 Fugle fra 3 Nætter); *Hyllekrog* Fyr, P. W. Sørensen og J. N. B. Höeg Fyrmestre (8 Fugle fra 5 Nætter).

De Fugle, der indkom til Zoologisk Museum som faldne i 1911, vare:

1. *Anas crecca* 1.
2. *Oedemia nigra* 4.
3. *Tachybaptes minor* 1.
4. *Procellaria pelagica* 1.
5. *Procellaria leucorrhoa* 2,
6. *Porzana maruetta* 4.
7. *Rallus aquaticus* 4.
8. *Gallinula chloropus* 1.

(1911.)

9. *Vanellus cristatus* 3. (16 faldt.)
10. *Charadrius squatarola* 1.
11. *Charadrius pluvialis* 2.
12. *Eudromias morinellus* 1.
13. *Ægialitis hiaticula* 1.
14. *Hæmatopus ostreologus* 1.
15. *Numenius arquatus* 2.
16. *Actitis hypoleuca* 1.
17. *Totanus calidris* 2.
18. *Tringa canutus* 4.
19. *Tringa alpina* 2.
20. *Calidris arenaria* 1.
21. *Limnocryptes gallinula* 4.
22. *Gallinago scolopacina* 6.
23. *Scolopax rusticula* 1. (4 faldt.)
24. *Columba livia domestica* 1.
25. *Columba palumbus* 2. (4 faldt.)
26. *Jynx torquilla* 11.
27. *Alauda arborea* 1.
28. *Alauda arvensis* 144. (306 faldt.)
29. *Sturnus vulgaris* 54. (86 faldt.)
30. *Troglodytes parvulus* 3.
31. *Accentor modularis* 1.
32. *Sylvia cinerea* 4. (5 faldt.)
33. *Sylvia atricapilla* 6.
34. *Sylvia hortensis* 15.
35. *Sylvia nisoria* 1.
36. *Hypolais icterina* 1.
37. *Acrocephalus arundinaceus* 1.
38. *Acrocephalus phragmitis* 2.
39. *Phyllopseustes trochilus* 31. (53 faldt.)
40. *Phyllopseustes rufus* 1.
41. *Regulus cristatus* 6.
42. *Anthus pratensis* 3.

(1911.)

43. *Anthus arboreus* 3.
44. *Anthus obscurus* 1.
45. *Turdus iliacus* 151. (766 faldt.)
46. *Turdus musicus* 96. (257 faldt.)
47. *Turdus viscivorus* 2.
48. *Turdus pilaris* 51. (182 faldt).
49. *Turdus torquatus* 9.
50. *Turdus merula* 37. (77 faldt.)
51. *Saxicola oenanthe* 46.
52. *Praticola rubetra* 3.
53. *Ruticilla phoenicura* 24.
54. *Erithacus rubecula* 80.
55. *Cyanecula suecica* 1.
56. *Luscinia vera* 1.
57. *Muscicapa atricapilla* 16. (28 faldt.)
58. *Muscicapa grisola* 2.
59. *Passer domesticus* 1.
60. *Passer montanus* 1.
61. *Fringilla coelebs* 2.
62. *Fringilla montifringilla* 22.
63. *Cannabina linota* 2.
64. *Cannabina linaria* 1.
65. *Emberiza schoeniclus* 13.
66. *Emberiza citrinella* 2.
67. *Emberiza miliaria* 2.
68. *Emberiza nivalis* 16.

Af de faldne Arter var en, nemlig *Luscinia vera*, ikke faldet ved Fyrene i Løbet af de foregaaende 25 Aar. Tallet paa de Arter, der ere faldne i Løbet af de sidste 26 Aar, er dermed naaet op til 159.

(1911.)

Fortegnelse over de Fugle der ere indsendte fra Fyrene som faldne om Natten.

(Hver Nat henregnes til den følgende Dag.)

1. *Anas crecca.* Krikand.
August: 31te Lyngvig 1.

2. *Oedemia nigra.* Sortand.
Marts: 1ste Graadyb 2 (♂ ad., ♂ jun.).
April: 21de Omø 2 ♂.

3. *Tachybaptes minor.* Lille Lappedykker.
April: 29de Hyllekrog 1 ♂.

4. *Procellaria pelagica.* Stormsvale.
November: 20de Lyngvig 1 ♀ jun.

5. *Procellaria leucorrhoa.* Stor Stormsvale.
Januar: 8de Sprogø 1 ♀ jun.
December: 30te Sejrø 1.

6. *Porzana maruetta.* Rørvagtel.
April: 2den Kjels Nor 1 ♂.
28de Lyngvig 1 ♀ ad.
29de Hanstholm 1 ♂.
Maj: 4de Skagen 1 ♂.

7. *Rallus aquaticus.* Vandrikse.
April: 22de Lyngvig 1.
26de Schultz's Grund 1.
27de Skagen 1 ♂.
28de Kjels Nor 1.

8. *Gallinula chloropus.* Rørhøne.
Marts: 29de Sprogø 1 ♀ ad.

9. *Vanellus cristatus.* Vibe.
Marts: 1ste Kjels Nor 1.
4de (Blaavandshuk 1.)*)
[28de Lyngvig 1 (2 faldt.).
April: 2den Lyngvig 1 (12 faldt.).

*) I Klammer er, efter Fyrmestrenes Oplysninger, vedføjet Tallet paa de faldne Fugle, naar dette er et andet end Tallet paa de indsendte; paa samme Maade vedføjes efter Fyrmestrenes Opgivelser Viber, Skovsnepper og Stære, selv om intet er indsendt.

(1911.)

10. *Charadrius squatarola.* Strandhjejle.

September: 25de Lodbjerg 1.

11. *Charadrius pluvialis.* Hjejle.

April: 22de Lyngvig 1.

Oktober: 2den Anholt 1.

12. *Eudromias morinellus.* Pomeransfugl.

August: 28de Rubjerg Knude 1 ♂ jun.

13. *Ægialitis hiaticula.* Præstekrave.

April: 29de Lodbjerg 1 ♀.

14. *Hæmatopus ostreologus.* Strandskade.

September: 17de Hammeren 1 jun.

15. *Numenius arquatus.* Storspove.

April: 23de Lyngvig 1.
24de Skagen 1 ♂.

16. *Actitis hypoleuca.* Mudderklire.

April: 27de Skagen 1 ♂.

17. *Totanus calidris.* Rødben.

Marts: 15de Graadyb 1 ♀ ad.

August: 28de Rubjerg Knude 1 ♀ jun.

18. *Tringa canutus.* Islandsk Ryle.

August: 22de Lyngvig 1 ♂ jun.
26de Lyngvig 1 jun.
29de Lyngvig 1 ♀ jun.

September: 1ste Fornæs 1 ♂ jun.

19. *Tringa alpina.* Ryle.

April: 28de Lyngvig 1 ♂.

December: 18de Læsø Rende 1 ♀ jun.

20. *Calidris arenaria.* Selning.

August: 29de Vyl 1 ♂ jun.

21. *Limnocryptes gallinula.* Enkelt Bekkasin.

April: 22de Kjels Nor 1.
28de Kjels Nor 1.
30te Æbelø 1 ♀.

November: 21de Stevns 1.

(1911.)

22. *Gallinago scolopacina.* Horsegøg.

Marts: 28de Lyngvig 1.
Maj: 3dje Lyngvig 1.
4de Skagen 1.
September: 25de Kjels Nor 1.
November: 20de Lodbjerg 2.

23. *Scolopax rusticula.* Skovsneppe.

April: 26de Hammeren 1.
November: 20de (Hesselø 3.)

24. *Columba livia domestica.* Husdue (Brevdue.).

Juli: 24de Omø 1.

25. *Columba palumbus.* Ringdue.

April: 1ste Kjels Nor 1.
Oktober: 2den Anholt 1 (3 faldt.).

26. *Iynx torquilla.* Vendehals.

April: 23de Æbelø 1 ♂.
24de Anholt 1 ♀ ad.
27de Læsø Rende 1 ♂, Østre Flak 1 ♂, Sejrø 1 ♂.
Maj: 3dje Hanstholm 1 ♂, Lodbjerg 1 ♀, Kjels Nor 1 ♂.
15de Skagen 1 ♀.
August: 21de Nakkehoved 1 ♀ jun.
23de Stevns 1 ♀ jun.

27. *Alauda arborea.* Hedelærke.

Marts: 4de Hyllekrog 1.

28. *Alauda arvensis.* Lærke.

Januar: 8de Kjels Nor 1 ♂.
26de Vyl 1 ♂.
27de Vyl 4 ♂, Lyngvig 1 ♂ (10 faldt).
28de Vyl 1 ♂.
30te Vyl 2 ♂.
Februar: 7de Vyl 1 ♂.
18de Vyl 1 ♀ ad., Horns Rev 2 ♀,
19de Lappegrunden 1 ♂.
20de Østre Flak 2.

(1911.)

Februar: 23de Læsø Trindel 1 ♂.
24de Læsø Rende 2, Østre Flak 4.
25de Læsø Trindel 1 ♂, Læsø Rende 2, Østre Flak 1.
26de Læsø Rende 5, Østre Flak 2, Schultz's Grund 5 (1 ♀, 4 ♂), (Sejrø 60 faldt.)

Marts: 1ste Læsø Trindel 1 ♂.
2den Østre Flak 3.
3dje Læsø Trindel 1 ♂.
4de Graadyb 1 ♀, Anholt Knob 1 ♂ (3 faldt.), Hjelm 2 ♂, Gedser Rev 5 (3 ♂, 1 ♀ ad., 1 ♀ jun., 10 faldt.)
5te Graadyb 1 ♀.
8de Kjels Nor 1 ♀ jun.
14de Graadyb 1 ♀ ad.
17de Vyl 1 ♀.
28de Vyl 1 ♀ ad.

April: 24de Anholt 2 ♀.
26de Schultz's Grund 2 ♀.

August: 28de Rubjerg Knude 1.
29de Lyngvig 1 ♂.

September: 24de Vyl 6 (5 ♀ jun., 1 ♀ ad.).

Oktober: 1ste Østre Flak 1, Anholt 3 (2 ♀ ad., 1 ♀ jun.), Schultz's Grund 2.
7de Vyl 1 ♀ ad.
24de Læsø Trindel 1 ♂.
25de Lodbjerg 2, Østre Flak 2 ♂, Anholt Knob 3 ♂, Anholt 16 (9 ♂, 7 ♀, 88 faldt.), Schult'z Grund 4 (3 ♂, 1 ♀, 7 faldt.).
26de Stevns 1 ♀ jun.
27de Graadyb 1 ♂, Vyl 3, Horns Rev 3 ♂, Lyngvig 1 ♂, Anholt 2 (♂, ♀), Anholt Knob 1 ♂.
28de Lyngvig 1 ♂ (10 faldt).
29de Stevns 11 (6 ♂, 5 ♀), Hov 1 ♀.

November: 14de Lyngvig 1 ♂ jun. (3 faldt).
19de Graadyb 2 ♂.

(1911.)

November: 20de Lyngvig 1 ♀, Anholt 1 ♂.
22de Østre Flak 1 ♂, Schultz's Grund 2 ♂.
23de Østre Flak 1 ♂.
29de Østre Flak 1 ♂ jun.

December: 9de Østre Flak 1.
12te Læsø Rende 1 ♂.
19de Anholt Knob 1 ♂.

29. *Sturnus vulgaris.* Stær.

Januar: 27de (Blaavandshuk 1.).

Februar: 19de (Vestborg 1.).
22de (Gedser Rev 1.).
25de Graadyb 1 ♂ ad.
26de Horns Rev 1 ♂ ad., (Sejrø 2.).
28de Vyl 1 ♂ ad.

Marts: 1ste Graadyb 1 ♂ ad., (Blaavandshuk 1.), Lyngvig 1 ♀ ad. (4 faldt.), Læsø Trindel 1 ♀ ad.
2den Vyl 1 ♂ ad., Lyngvig 1 ♂ ad. (11 faldt.), Lodbjerg 9 (5 ♂ ad., 3 ♀ ad., 1 ♀ jun.), (Læsø Rende 1.), Østre Flak 1 ♂ ad., Schultz's Grund 2 ♂.
3dje Læsø Trindel 1 ♂, (Graadyb 1.).
4de Graadyb 1 ♀ ad., Vyl 2 (1 ♀ jun.), Hjelm 1 ♀ ad., Thunø 1 ♂ ad.
8de Kjels Nor 2 (♀ ad., ♂).
9de Graadyb 1 ♂ jun.
23de (Gedser Rev 1.).
30te Vyl 1 ♀.

April: 2den Hov 1 ♀ ad., Kjels Nor 4.
3dje Graadyb 2.
4de Graadyb 3.
16de Anholt Knob 1 ♂ ad.
23de Vyl 1 ♂, Anholt 1 ♀ (2 faldt).
28de (Vestborg 1.).

September: 25de Schultz's Grund 1.

Oktober: 6te Graadyb 1 ♀ jun.

(1911.)

Oktober: 15de Graadyb 1 ♀ jun.
24de (Blaavandshuk 2.).
25de (Blaavandshuk 2.), Vyl 1, Lodbjerg 2, Rubjerg Knude 1, Anholt Knob 1 ♀ ad., Schultz's Grund 1 ♀ jun.
27de (Blaavandshuk 1.), (Hesselø 2.).
November: 2den (Gedser Rev 1.).
20de Læsø Rende 1 ♀ ad., Anholt Fyr 1 ♀ jun.

30. *Troglodytes parvulus.* Gærdesmutte.
April: 2den Kjels Nor 1 ♂.
September: 16de Anholt Knob 1.
Oktober: 19de Lyngvig 1.

31. *Accentor modularis.* Jernspurv.
April: 23de Anholt Fyr 1.

32. *Sylvia cinerea.* Tornsanger.
Maj: 15de Skagen 1 ♀.
August: 28de Hirtshals 1 ♂ jun., Skagen 2 (♂, ♂ jun., 3 faldt.).

33. *Sylvia atricapilla.* Munk.
Maj: 2den Kjels Nor 1 ♂.
25de Kjels Nor 1 ♀.
September: 24de Vyl 1 ♀ jun.
25de Kjels Nor 2, Gedser Rev 1 ♂.

34. *Sylvia hortensis.* Havesanger.
Maj: 25de Kjels Nor 2.
August: 28de Rubjerg Knude 3, Hirtshals 1, Skagen 2.
September: 24de Vyl 1 ♂ jun., Hanstholm 1.
25de Anholt Knob 1, Kjels Nor 3, Gedser 1.

35. *Sylvia nisoria.* Høgesanger.
August: 29de Lyngvjg 1 ♀ jun.

36. *Hypolais icterina.* Gulbug.
Maj: 25de Hyllekrog 1.

37. *Acrocephalus arundinaceus.* Rørsanger.
Maj: 25de Kjels Nor 1 ♂.

(1911.)

38. *Acrocephalus phragmitis.* Sivsanger.

April: 28de Kjels Nor 1 ♂.
September: 25de Gedser 1.

39. *Phyllopseustes trochilus.* Løvsanger.

April: 26de Schultz's Grund 1 ♂.
Maj: 16de Østre Flak 1.
25de Kjels Nor 1.
August: 28de Rubjerg Knude 9, Hirtshals 8 (2 ♀ jun., 1 ♂, 1 ♀ ad.), Skagen 4 (26 faldt.), Læsø Trindel 2 (1 ♀ jun.).
September: 24de Vyl 2 (♂, ♀), Lodbjerg 1.
25de Graadyb 1, Gedser Rev 1.

40. *Phyllopseustes rufus.* Gransanger.

Oktober: 1ste Anholt 1.

41. *Regulus cristatus.* Fuglekonge.

April: 26de Schultz's Grund 1 ♀.
29de Østre Flak 1 ♂.
September: 25de Graadyb 1 ♂.
Oktober: 10de Anholt Knob 1 ♀.
25de Østre Flak 1 ♂.
November: 19de Østre Flak 1 ♂.

42. *Anthus pratensis.* Engpiber.

April: 2den Vyl 1.
September: 6te Vyl 1.
Oktober: 9de Vyl 1.

43. *Anthus arboreus.* Skovpiber.

September: 24de Vyl 2 (1 ♂).
25de Kjels Nor 1.

44. *Anthus obscurus.* Skærpiber.

Oktober: 24de Lyngvig 1.

45. *Turdus iliacus.* Vindrossel.

April: 22de Kjels Nor 2.
24de Skagen 2, Østre Flak 1.

(1911).

April: 27de Læsø Rende 1, Anholt Knob 1, Sejrø 2, Omø 1.
28de Stevns 1.

Oktober: 15de Graadyb 1 ♀ jun.
20de Læsø Trindel 6 (3 ♂ jun., 1 ♂ ad., 2 ♀ ad.).
24de Vyl 2, Lyngvig 1 ♀ ad. (68 faldt), Læsø Trindel 6 (1 ♂ jun., 2 ♂ ad., 3 ♀ jun.), Gedser 1.
25de Vyl 1, Lodbjerg 14, Horns Rev 12, Rubjerg Knude 10, Østre Flak 10 (5 ♂, 1 ♀ ad., 3 ♀ jun.), Anholt Knob 1 ♂, Anholt 1 ♀ ad. (c. 18 faldt), Schultz's Grund 5 (2 ♂, 3 ♀ jun., 21 faldt).
26de Lyngvig 1 ♀ ad., Stevns 2 (1 ♂ jun., 1 ♀ jun.).
27de Graadyb 4 (3 ♂ ad., 1 ♀ jun.,), Vyl 1, Horns Rev 8, Lyngvig 1 ♂ ad. (327 faldt.), Anholt 13 (6 ♂, 7 ♀ ad., 142 faldt).
28de Vyl 1, Lyngvig 1 ♂, Kjels Nor 20.

November: 11te Læsø Trindel 2.
20de Lyngvig 1, Østre Flak 1 (mange faldt), Anholt Knob 5 (65 faldt.).
21de Anholt Knob 1, Stevns 2.
22de Østre Flak 2, Schultz's Grund 2.

December: 17de Gedser 1.

46. *Turdus musicus.* Sangdrossel.

April: 1ste Hyllekrog 1 ♂.
20de Schultz's Grund 2 (16 faldt.).
22de Vyl 1 (2 faldt), Læsø Rende 4, Kjels Nor 2.
23de Graadyb 1, Vyl 1 (6 faldt.), Læsø Trindel 1, Anholt Knob 1, Æbelø 1.
24de Skagen 2, Østre Flak 1, Anholt 2 (19 faldt).
26de Vyl 1 (6 faldt.), Schultz's Grund 2 (4 faldt.).
27de Skagen 1 (20 faldt.), Læsø Rende 1, Østre Flak 4.
28de Schultz's Grund 4 (10 faldt, mange udenbords), Stevns 1, Kjels Nor 9.
29de Lodbjerg 2, Østre Flak 1.

30te Skagen 1 (20 faldt).

Maj: 2den Lyngvig 1 (4 faldt.).

3dje Lodbjerg 1, Hanstholm 2.

September: 23de Gedser 1 jun.

24de Vyl 2 ♂.

25de Lodbjerg 1, Læsø Rende 1 ♀ jun., Østre Flak 1 ♂ jun., Kjels Nor 1.

Oktober: 1ste Graadyb 1 ♂ jun., Schultz's Grund 13, Gedser Rev 6.

2den Anholt Knob 3 (1 ♂ ad., 1 ♀ ad., 56 faldt.).

24de Læsø Trindel 1 jun.

25de Horns Rev 1, Lodbjerg 1, Østre Flak 5 (4 ♂, 1 ♀ ad.), Anholt 1 ♀ ad. (c. 18 faldt.)

27de Graadyb 2 ♂. Vyl 1.

28de Kjels Nor 2.

29de Stevns 1 ♂.

47. *Turdus viscivorus.* Misteldrossel.

April: 28de Stevns 1 ♀.

Oktober: 25de Anholt Knob 1 ♀ ad.

48. *Turdus pilaris.* Sjagger.

Februar: 26de Horns Rev 1 ♀ ad.

April: 22de Graadyb 1, Lyngvig 1 (2 faldt.).

23de Anholt Fyr 1 ♂ (32 faldt.).

24de Skagen 1 ♀, Anholt 1 ♀ ad. (6 faldt.).

26de Graadyb 1 ♀.

27de Anholt Knob 1 ♂, Omø 1 ♀.

28de Stevns 1 ♀, Kjels Nor 1.

29de Østre Flak 3.

30te Skagen 1 ♂ (4 faldt).

Oktober: 25de Vyl 1.

27de Graadyb 1 ♂, Vyl 1.

November: 2den Vyl 1, Lyngvig 1 (4 faldt.).

12te Anholt Knob 1.

14de Lyngvig 1.

(1911.)

November: 15de Østre Flak 1 ♂, Anholt Knob 1.
20de Lyngvig 1, Lodbjerg 1, Læsø Rende 7 (1 ♂, 3 ♀ ad., 1 ♀ jun.), Østre Flak 1 ♂ (mange faldt.), Anholt Knob 1, Anholt 6 (1 ♂ ad., 2 ♀ ad, 1 ♀ jun., 92 faldt), Nakkehoved 1 (3 faldt.).
21de Østre Flak 2.
22de Schultz's Grund 6.
29de Østre Flak 1.

49. *Turdus torquatus.* Ringdrossel.

April: 23de Anholt 1 ♂.
24de Læsø Trindel 1.
27de Østre Flak 1 ♂.
29de Lodbjerg 1 ♂, Hanstholm 1 ♂.
Maj: 3dje Vyl 1.
September: 24de Hanstholm 1 ♀ ad.
Oktober: 1ste Gedser Rev 1.
3dje Vyl 1 ♂ jun.

50. *Turdus merula.* Solsort.

Februar: 26de Vyl 1 ♂ ad.
Marts: 1ste Læsø Trindel 1 ♀ ad.
4de Graadyb 1 ♀ ad.
8de Kjels Nor 1 ♂ ad.
April: 24de Læsø Trindel 1 ♀.
27de Sejrø 1 ♂ ad., Omø 1 ♀.
29de Hanstholm 1 ♂.
Oktober: 7de Vyl 1 ♀ jun.
24de Læsø Trindel 2 (1 ♂ jun., 1 ♀ jun.).
25de Rubjerg Knude 1 ♀ ad., Østre Flak 1 ♀ jun., (Hesselø 2.), Schultz's Grund 1 ♀ jun.
27de Schultz's Grund 1 ♂ jun., (Hesselø 3.).
November: 11te Læsø Trindel 5 (2 ♂ jun., 2 ♀ jun.).
12te Østre Flak 1 ♂ ad.
13de Thunø 1 ♀ jun.
14de Lyngvig 1.

20de Østre Flak 1 ♀ jun. (mange faldt), Anholt Knob 1 ♂ jun. (2 faldt), Anholt 4 (♂ ad., ♂ jun., 2 ♀ ad., 28 faldt), (Hesselø 10).
21de Østre Flak 4 (2 ♂ ad., 1 ♂ jun., 1 ♀).
22de Anholt Knob 1 ♂ ad., Schultz's Grund 3 (♂ jun., ♀ jun., ♀ ad.).

51. *Saxicola oenanthe.* Stenpikker.
April: 23de Graadyb 2 (♂, ♀), Vyl 2 ♂, Anholt 1 ♀.
24de Læsø Rende 1 ♂, Anholt 1 ♀.
26de Graadyb 1 ♂, Vyl 2 ♂.
27de Læsø Rende 1 ♀.
28de Lyngvig 1 ♂, Lodbjerg 2 ♂.
30te Skagen 2 (♂, ♀).
Maj: 3dje Lodbjerg 1 ♂, Hanstholm 3 (2 ♂, 1 ♀).
4de Graadyb 1.
September: 11te Vyl 1.
24de Graadyb 1 ♀ jun., Vyl 10 (6 ♂, 1 ♀ ad., 2 ♀ jun.), Lodbjerg 1 ♂ ad., Hanstholm 2, Anholt Knob 1.
25de Læsø Rende 1, Østre Flak 1, Schultz's Grund 1, Gedser Rev 1 ♂, Kjels Nor 2.
26de Østre Flak 1.
Oktober: 1ste Anholt 1 ♂ ad.
November: 21de Østre Flak 1 ♂ jun.

52. *Praticola rubetra.* Bynkefugl.
April: 27de Sejrø 1 ♂.
Maj: 13de Vyl 1 ♂.
17de Læsø Rende 1 ♂.

53. *Ruticilla phoenicura.* Rødstjert.
April: 27de Læsø Trindel 1 ♂.
Maj: 2den Lyngvig 1 ♂.
13de Vyl 2 ♂.
16de Vyl 1 ♂, Østre Flak 1 ♀.
August: 22de Lyngvig 1 ♂.

(1911.)

28de Rubjerg Knude 1 ♀, Hirtshals 1 ♂, Skagen 6 (3 ♂, 3 ♀), Læsø Trindel 1 ♂.

September: 24de Lodbjerg 2 (♀, ♂).

25de Østre Flak 1, Schultz's Grund 1, Kjels Nor 2, Gedser Rev 1.

27de Læsø Trindel 1 ♂ jun.

54. *Erithacus rubecula.* Rødkælk.

April: 1ste Anholt Knob 1 ♂, Hyllekrog 1.

23de Østre Flak 1, Anholt 3, Hyllekrog 1 ♀ jun.

24de Læsø Rende 1.

26de Schultz's Grund 4.

27de Læsø Trindel 1 ♀, Østre Flak 1 ♂, Anholt Knob 5 (2 ♂, 3 ♀), Sejrø 1.

28de Anholt Knob 1 ♂.

29de Østre Flak 1 ♀.

30te Læsø Trindel 2 ♀, Anholt Knob 1 ♀.

Maj: 3dje Læsø Rende 2 (♂, ♀).

September: 24de Vyl 2, Hanstholm 2, Læsø Trindel 1 ♀ jun.

25de Schultz's Grund 2, Kjels Nor 9, Gedser Rev 5.

26de Læsø Rende 1, Østre Flak 1, Anholt Knob 1.

30te Anholt Knob 1.

Oktober: 1ste Anholt 2 ♀ ad., Schultz's Grund 6.

11te Vyl 1.

20de Læsø Trindel 2 (♂, ♀ jun.).

24de Lyngvig 1 ♀ jun., Læsø Trindel 3 (1 ♂, 2 ♀).

25de Østre Flak 2 ♂.

27de Anholt Knob 1 ♂, Schultz's Grund 1 ♂ ad.

28de Kjels Nor 2.

29de Stevns 7 (3 ♀ jun., 2 ♂).

55. *Cyanecula suecica.* Blaakælk.

September: 26de Østre Flak 1 ♀ jun.

56. *Luscinia vera.* Sydlig Nattergal.

Maj: 25de Kjels Nor 1 ♀ ad.

57. *Muscicapa atricapilla.* Broget Fluesnapper.

April: 24de Skagen 1 ♂, Læsø Rende 3 ♂.
30te Skagen 1 ♂.
Maj: 3dje Lyngvig 1 ♂, Lodbjerg 1 ♂.
16de Østre Flak 1 ♀.
17de Læsø Rende 1 ♂.
25de Kjels Nor 1 ♂.
August: 28de Skagen 4 (16 faldt.).
September: 24de Vyl 1 ♀.
25de Kjels Nor 1.

58. *Muscicapa grisola.* Graa Fluesnapper.

Maj: 15de Skagen 1 ♂.
25de Lyngvig 1.

59. *Passer dometicus.* Spurv.

April: 30te Lyngvig 1 ♂.

60. *Passer montanus.* Skovspurv.

Oktober: 11te Anholt Knob 1.

61. *Fringilla coelebs.* Bogfinke.

Oktober: 9de Vyl 1 ♂ ad.
14de Vyl 1 ♀ jun.

62. *Fringilla montifringilla.* Kvækerfinke.

April: 23de Anholt 1 ♀, Hyllekrog 1 ♀.
24de Anholt 1.
28de Kjels Nor 1.
September: 24de Lodbjerg 1 ♀.
Oktober: 1ste Anholt 4 ♂ ad.
8de Lyngvig 1 ♀.
20de Læsø Trindel 2 ♂.
24de Lyngvig 1 ♂, Læsø Trindel 1 ♂.
25de Østre Flak 1 ♀, Anholt 1 ♀ ad.
27de Horns Rev 1 ♂, Lyngvig 1 ♂, Anholt 3 (2 ♂, 1 ♀).
28de Vyl 1 ♀.

(1911.)

63. *Cannabina linota.* Irisk.

Marts: 29de Vyl 1 ♀ ad.
Oktober: 15de Graadyb 1 ♂.

64. *Cannabina linaria.* Graasisken.

November: 19de Østre Flak 1 ♂.

65. *Emberiza schoeniclus.* Rørspurv.

April: 24de Læsø Rende 1 ♂.
30te Skagen 1 ♂.
September: 24de Anholt Knob 1.
Oktober: 1ste Anholt 7 (1 ♂, 1 ♀ jun., 5 ♀ ad.).
25de Anholt 2.
29de Stevns 1 ♂ jun.

66. *Emberiza citrinella.* Gulspurv.

Oktober: 20de Anholt Knob 1.
November: 20de Anholt 1 ♀ ad.

67. *Emberiza miliaria.* Bomlænke.

November: 29de Drogden 1 ♂.
30te Drogden 1 ♀ jun.

68. *Emberiza nivalis.* Snespurv.

Marts: 4de Hyllekrog 1 ♀ ad.
15de Vyl 2 ♀.
28de Lyngvig 1 ♀ jun.
Oktober: 25de Schultz's Grund 1 ♀ jun.
27de Anholt Knob 1 ♀ jun., Anholt 1.
28de Vyl 1 ♀, Lyngvig 1 ♂.
November: 15de Østre Flak 1 ♀.
19de Graadyb 1 ♀.
20de Anholt 2 ♂.
22de Schultz's Grund 1 ♂.
December: 9de Østre Flak 2 ♂.

Oversigt over de Nætter da Fugle ere komne til Fyrene.

Hver Nat henregnes til den følgende Dag. — Tallet efter Vindretningen betegner Vindstyrken efter Beauforts Skala (0—12), hvor

1 betyder: Let Brise.
2 — : Laber Bramsejlskuling.
3 — : Bramsejlskuling.
4 — : Merssejlskuling.
5 — : Rebet Merssejlskuling.
6 — : Torebet Merssejlskuling.
7 betyder: Trerebet Merssejlskuling.
8 — : Klosrebet Merssejlskuling.
9 — : Undersejlskuling el. Storm.
10 — : Haard Storm.
11 — : Orkanagtig Storm.
12 — : Orkan.

8de Januar.

Lodbjerg. S. 3, overtr., diset. 1 Stær ved Ruderne om Morgenen.
Sprogø. S. V. 3, diset. En Stor Stormsvale faldt.
Kjels Nor. S., S. V. 2, skyet og diset. En Lærke faldt.
Procellaria leucorrhoa. Sprogø 1.
Alauda arvensis. Kjels Nor 1.

13de Januar.

Bovbjerg. N. Ø., skyet og diset. En Stær ved Fyret om Natten.

21de Januar.

Lyngvig. V. S. V. 3, overtrukket. En Stær ved Fyrruderne.
Lodbjerg. S. Ø. 2, klart. En Lærke ved Ruderne før Midnat.

26de Januar.

Vyl. V. S. V. 5, Regn. En Lærke fandtes død paa Dækket om Morgenen.
Alauda arvensis 1.

27de Januar.

Blaavandshuk. V., Regntykning. 1 Stær og 1 Drossel faldt (ikke indsendte.).
Vyl. V. N. V. 3, Regn. Flere Lærker saas om Natten, 4 faldt.
Horns Rev. V., overtr. Omkr. 80 Lærker ved Fyret om Natten.
Lyngvig. V. 3, overtr. Stære og Lærker om Fyret. 10 Lærker faldt.
Alauda arvensis. Vyl 4, Lyngvig 1 (10 faldt.).
(*Sturnus vulgaris.* Blaavandshuk 1.).

28de Januar.

Vyl. V. N. V. 3, skyet. Enkelte Lærker ved Fyret om Natten, 1 faldt.
Lodbjerg. V. 3, overtr., diset. 2 Stære ved Ruderne efter Midnat.
Alauda arvensis. Vyl 1.

(1911.)

30te Januar.

Vyl. Ø. S. Ø. 3, skyet. Enkelte Lærker om Fyret, 2 faldt.

Alauda arvensis 2.

3dje Februar.

Læsø Trindel. N. N. V. 2, Taage. Fugle ved Fyret.

7de Februar.

Vyl. N. N. V. 4, Regnbyger. En Lærke faldt.

Alauda arvensis 1.

18de Februar.

Vyl. S. V. 3, graat. Flere Smaaflokke Lærker ved Fyret om Morgenen; en Lærke faldt.

Horns Rev. V., Regn. Omkr. 50 Lærker ved Fyret om Natten, 2 faldt.

Alauda arvensis. Vyl 1, Horns Rev 2.

19de Februar.

Horns Rev. V., Regn. Enkelte Fugle ved Fyret om Natten.

Vestborg. S. Ø., diset. En Stær faldt (ikke indsendt.).

Lappegrunden. S. Ø. 2, overtrukket, Regn. En Lærke faldt.

Alauda arvensis. Lappegrunden 1.
(*Sturnus vulgaris.* Vestborg 1.)

20de Februar.

Østre Flak. S. S. Ø. 1, Snebyger. Flere Lærker saas ved Fyret i Løbet af Natten; 2 faldt.

Gedser Rev. V. 4, Regndis. 2 Lærker ved Fyret.

Alauda arvensis. Østre Flak 2.

21de Februar.

Gedser Rev. N. V. 5, Snevejr. En Lærke ved Fyret.

22de Februar.

Gedser Rev. V. S. V. 4, Snevejr. 3 Stære ved Fyret, 1 faldt paa Dækket (ikke indsendt.).

(*Sturnus vulgaris* 1.)

23de Februar.

Læsø Trindel. S. V. 5, Regnbyger. Smaafugle — Lærker og Stære — om Fyret, endel faldt i Vandet; 1 Lærke faldt paa Dækket.

Alauda arvensis 1.

(1911.)

24de Februar.

Lodbjerg. 6, overtr., Regn, Dis. En Lærke og 2 Stære ved Ruderne efter Midnat.

Læsø Rende. V. 4, Regnbyger. 2 Lærker faldt.

Østre Flak. S. V. 3, overtr. Flere Lærker saas ved Fyret; 4 faldt.

Anholt. S. V. 6, overtr., Regn. Enkelte Lærker ved Fyret; ingen faldt.

Gedser Rev. S. V. 5, Regn. En Vibe ved Fyret.

Alauda arvensis. Læsø Rende 2, Østre Flak 4.

25de Februar.

Graadyb. S. Ø. 3, Regn. Flere Fugle ved Fyret. En Stær faldt.

Læsø Trindel. S. S. Ø. 4, Regn og Sne. Smaafugle om Fyret; en Lærke faldt.

Læsø Rende. N. V. 5, Snebyger. Flere Smaafugle ved Fyret; 2 Lærker faldt.

Østre Flak. N. V. 1, skyet. En Lærke faldt.

Alauda arvensis. Læsø Trindel 1, Læsø Rende 2, Østre Flak 1.
Sturnus vulgaris. Graadyb 1.

26de Februar.

Vyl. V. S. V. 3, Regn. Endel Lærker og Stære ved Fyret om Natten; 1 Solsort faldt.

Horns Rev. N. V. Skyet. Enkelte Fugle ved Fyret om Natten; 1 Stær og 1 Sjagger faldt.

Bovbjerg. S., Sne og Regn. Nogle Stære ved Fyret.

Lodbjerg. S. S. Ø. senere V. N. V., 4, overtr., Regn, Sne og Dis. Mange Stære ved Ruderne efter Midnat.

Læsø Rende. S. 3, Regn, Snebyger. 5 Lærker faldt.

Østre Flak. S. 2, Regn. En stor Flok Lærker fløj omkring Skibet, da det blev Dag; 2 Lærker faldt.

Anholt Knob. S. S. Ø. 4, Regn og Sne. Enkelte Lærker ved Fyret og omkring Skibet.

Schultz's Grund. S. 3, Sne. 5 Lærker faldt.

Sejrø. S. S. Ø. henad Morgen V. S. V., Snetykning, Regn, diset og overtrukket. Store Fugletræk; Lærker og Stære paa og omkring Fyret; omkring 60 Lærker og 2 Stære faldt (ikke indsendte).

(1911.)

Vestborg. S., Regn. 1 Lærke faldt (ikke indsendt).

Sprogø. En Lærke paa Fyrets Ruder.

Æbelø. S. V. Overtrukket, Regn. Endel Lærker og Stære paa Ruderne; 6 Lærker faldt (ikke indsendte.).

Gedser Rev. V. 3, Regn. Omkr. 25 Lærker ved Fyret; 1 faldt (ikke indsendt.).

Alauda arvensis. Læsø Rende 5, Østre Flak 2, Schultz's Grund 5, (Sejrø 60).
Sturnus vulgaris. Horns Rev 1, (Sejrø 2).
Turdus pilaris. Horns Rev 1.
Turdus merula. Vyl 1.

28de Februar.

Vyl. S. S. V. 4, Regn. En Stær faldt.

Sturnus vulgaris 1.

1ste Marts.

Graadyb. S. V. 4, Regn. Mange Smaafugle og Viber ved Fyret; 2 Sortænder og 1 Stær faldt.

Blaavandshuk. V. S. V. 5, Regntykning. 1 Stær faldt (ikke indsendt.).

Lyngvig. S. V. 3, overtrukket. Endel Stære om Fyret; 1 faldt.

Bovbjerg. S. V. 3, Taage. En hel Del Stære ved Fyret om Natten.

Lodbjerg. S. V. 5, overtrukket, Taage. Enkelte Viber i Nærheden af Taarnet efter Midnat; nogle Stære ved Ruderne efter Midnat.

Læsø Trindel. S. V. 4, Regn. Fugle om Fyret; 1 Lærke, 1 Stær og 1 Solsort faldt.

Kjels Nor. S. V. 4, Regnbyger. 1 Vibe faldt.

Æbelø. S. V. Regn. Endel Stære paa Ruderne; ingen faldt.

Oedemia nigra. Graadyb 2.
Vanellus cristatus. Kjels Nor 1.
Alauda arvensis. Læsø Trindel 1.
Sturnus vulgaris. Graadyb 1, (Blaavandshuk 1.), Lyngvig 1 (4 faldt.), Læsø Trindel 1.
Turdus merula. Læsø Trindel 1.

2den Marts.

Vyl. V. S. V. 4, Regn. En Stær faldt.

Lyngvig. V. S. V. 6, Regn. Mange Stære om Fyret; 11 faldt.

Bovbjerg. V. 7, skyet, Dis. En hel Del Stære ved Fyret om Natten.

(1911.)

Lodbjerg. V. S. V. 7, overtrukket, Regn og Dis. Mange Stære ved Ruderne efter Midnat; 9 faldt.

Læsø Rende. V. 4, Regnbyger. Flere Stære ved Fyret, 1 faldt (ikke indsendt.).

Østre Flak. V. S. V. 3, Regn. 3 Lærker og 1 Stær faldt.

Anholt Knob. V. 5, overtrukket, Regn. Enkelte Lærker og Solsorter ved Fyret og omkring Skibet.

Anholt. V. 7, overtrukket. Endel Lærker og Solsorter omkring Ruderne; ingen faldt.

Schultz's Grund. S. V. 4, Regn. 2 Stære faldt.

Alauda arvensis. Østre Flak 3.

Sturnus vulgaris. Vyl 1, Lyngvig 1 (11 faldt.), Lodbjerg 9, (Læsø Rende 1), Østre Flak 1, Schultz's Grund 2.

3dje Marts.

Graadyb. N. V. 8, Byger. En Stær faldt.

Læsø Trindel. V. 3, Taage. Fugle om Fyret; en Lærke og en Stær faldt.

Alauda arvensis. Læsø Trindel 1.

Sturnus vulgaris. Læsø Trindel 1, (Graadyb 1.).

4de Marts.

Graadyb. S. V. 3, Regn og Taage. Mange Fugle ved Fyret, deriblandt Stære, Lærker og Strandskader; Fugletræk saas ustandseligt; 1 Lærke, 1 Stær og 1 Solsort faldt.

Blaavands Huk. V. S. V. 2, Taage. En Flok Viber ved Fyret; 1 faldt (ikke indsendt.).

Vyl. V. 2, Taage. Endel Lærker og Stære om Fyret; 2 Stære faldt.

Lodbjerg. V. 4, overtrukket, Dis. Mange Stære ved Ruderne før og efter Midnat.

Anholt Knob. S. V. 4, Regn og Taage. Lærker saas ved Fyret; 3 faldt.

Hjelm. V. 3, Taage. Endel Lærker og Stære ved Ruderne; 2 Lærker og 1 Stær faldt.

Thunø. S. V. 2, Taage. En Stær faldt.

Gedser Rev. S. V. 2, Taage. 10 Lærker faldt.

(1911.)

Hyllekrog. V. 3, Taage. Nogle Smaafugle ved Ruderne; 1 Hedelærke og 1 Snespurv faldt.

Alauda arvensis. Graadyb 1, Anholt Knob 1 (3 faldt.), Hjelm 2, Gedser Rev 5.

Alauda arborea. Hyllekrog 1.

Sturnus vulgaris. Graadyb 1, Vyl 2, Hjelm 1, Thunø 1.

Turdus merula. Graadyb 1.

Emberiza nivalis. Hyllekrog 1.

5te Marts.

Graadyb. V. N. V. 3, Regnbyger. En Lærke faldt.

Alauda arvensis 1.

8de Marts.

Kjels Nor. S. 3, Regnbyger. 1 Lærke, 2 Stære og 1 Solsort faldt.

Alauda arvensis 1.

Sturnus vulgaris 2.

Turdus merula 1.

9de Marts.

Graadyb. En Stær faldt.

Sturnus vulgaris 1.

14de Marts.

Graadyb. Ø. 3, Regnbyger. En Lærke faldt.

Alauda arvensis 1.

15de Marts.

Vyl. S. Ø 3, Regn. Enkelte Lærker saas ved Fyret; 2 Snespurve faldt.

Emberiza nivalis 2.

17de Marts.

Vyl. Ø. 4, skyet. En Lærke faldt.

Alauda arvensis 1.

23de Marts.

Gedser Rev. Ø. 3, overtrukket. 15 Lærker, 5 Stære og 1 Spurvehøg ved Fyret; 1 Stær og 2 Lærker faldt paa Dækket (ikke indsendte).

Hyllekrog. Ø. N. Ø. 2, overtrukket. Mange Stære paa Ruderne.

Sturnus vulgaris. (Gedser Rev 1).

28de Marts.

Vyl. Ø. 2, graat. Endel Fugle ved Fyret om Natten, deriblandt Viber, Lærker samt Raager, der sad i Rigningen; en Vibe faldt og gik om paa Dækket til det blev Dag, da den atter fløj bort; 1 Lærke faldt.

Lyngvig. Ø. 2, overtrukket. Viber og Stære om Fyret; 2 Viber, 1 Horsegøg og 1 Snespurv faldt.

Vanellus cristatus. Lyngvig 1 (2 faldt.).
Gallinago scolopacina. Lyngvig 1.
Alauda arvensis. Vyl 1.
Emberiza nivalis. Lyngvig 1.

29de Marts.

Vyl. Ø. N. Ø. 2, graat. Endel Fugle ved Fyret om Natten; Lærker og Viber kendtes; en Irisk faldt.

Læsø Rende. N. Ø. 2, skyet. En ubekendt Fugl faldt, ikke indsendt.

Sprogø. N. Ø. 3, Taage. En Rørhøne og en Lærke (ikke indsendt) faldt.

Gallinula chloropus. Sprogø 1.
Cannabina linota. Vyl 1.

30te Marts.

Vyl. Ø. S. Ø. 3, Taage. 1 Stær faldt.

Sturnus vulgaris 1.

1ste April.

Anholt Knob. S. Ø. 2, skyet. En Rødkælk faldt.

Anholt. Ø. S. Ø. 4, overtrukket. Endel Solsorter og Drosler ved Ruderne; ingen faldt.

Kjels Nor. Ø. S. Ø. senere V. 2, Taage. En Ringdue faldt.

Hyllekrog. Mellem S. Ø. og S. V. Flovt og Taage. Mange Smaafugle paa Ruderne, Drosler, Stære og Rødkælke. En Sangdrossel og en Rødkælk faldt.

Columba palumbus. Kjels Nor 1.
Turdus musicus. Hyllekrog 1.
Erithacus rubecula. Anholt Knob 1, Hyllekrog 1.

2den April.

Vyl. Stille, Taage. En Engpiber faldt.

(1911.)

Lyngvig. Stille, overtrukket, diset. Mange Viber, Hjejler og Regnspover om Fyret; 12 Viber faldt.

Lodbjerg. S. V. 2, Taage. Enkelte Stære og 1 Rødkælk ved Ruderne efter Midnat.

Hov. S. Ø. 2, diset og Taage. En Stær faldt.

Kjels Nor. Ø. senere V. S. V. 2, Taage. 1 Rørvagtel, 4 Stære og 1 Gærdesmutte faldt.

Porzana maruetta. Kjels Nor 1.
Vanellus cristatus. Lyngvig 1 (12 faldt).
Sturnus vulgaris. Hov 1, Kjels Nor 4.
Troglodytes parvulus. Kjels Nor 1.
Anthus pratensis. Vyl 1.

3dje April.

Graadyb. N. N. Ø. 7, klart. Mange Stære omkring Skibet; 2 faldt.

Sturnus vulgaris 2.

4de April.

Graadyb. N. Ø. 5, klart. Mange Stære omkring Skibet; 3 faldt.

Sturnus vulgaris 3.

16de April.

Anholt Knob. V. 4, Regn. 1 Stær faldt.

Sturnus vulgaris 1.

18de April.

Lodbjerg. S. S. Ø. 3, skyet. 2 Stære og 1 Fuglekonge ved Ruderne efter Midnat.

Hanstholm. S. Ø. 2, overtrukket. Endel Solsorter og enkelte Drosler flagrede om Fyret fra Kl. 11 til Daggry.

Skagen. S. S. V. 4, diset. Store Mængder af Stære, Drosler, Rødbryste, Kongefugle og 1 Skovsneppe ved Ruderne; 1 Stær, 1 Solsort og 1 Drossel faldt (ikke indsendte).

Skagens Rev. S. Ø. 2, overtrukket. En Mængde Smaafugle vare ved Fyret om Natten; enkelte faldt i Vandet.

Anholt Knob. S. 3, overtrukket, Regn. Enkelte Smaafugle saas ved Fyret og nogle opholdt sig paa Skibet.

(1911.)

19de April.

Lodbjerg. S. Ø. 3, overtrukket, Dis. 1 Solsort og 1 Fuglekonge ved Ruderne efter Midnat.

20de April.

Schultz's Grund. S. S. V. 2, Regn. 16 Sangdrosler faldt.

Turdus musicus 2 (16 faldt).

21de April.

Skagen. V. 3, diset. Endel Stære, Drosler, Rødbryste, Digesmutter m. fl. paa Ruderne; 1 Drossel faldt (ikke indsendt.).

Læsø Trindel. S. V. 3, overtrukket. Enkelte Fugle ved Fyret.

Omø. N. V. til V. 2, skyet. 2 Sortænder faldt.

Oedemia nigra. Omø 2.

22de April.

Graadyb. S. V. 4, overtrukket. En Sjagger faldt, ellers ingen Fugle ved Fyret.

Vyl. S. V. 3, graat. Nogle Smaafugle vare ved Fyret om Natten: 1 faldt i Vandet, 2 Sangdrosler faldt paa Dækket.

Lyngvig. S. V. 4, diset. Hjejler og Drosler om Fyret; en Vandrikse, en Hjejle og 2 Sjaggere faldt.

Læsø Rende. S. V. 3, overtrukket. 4 Sangdrosler faldt.

Hesselø. V. S. V. 4. 1 Vandhøne og 2 Sjaggere faldt (intet indsendt.).

Kjels Nor. S. V. 3, overtrukket. 1 Enkelt Bekkasin, 2 Sangdrosler og 2 Vindrosler faldt.

Rallus aquaticus. Lyngvig 1.
Limnocryptes gallinula. Kjels Nor 1.
Charadrius pluvialis. Lyngvig 1.
Turdus iliacus. Kjels Nor 2.
Turdus musicus. Vyl 1 (2 faldt), Læsø Rende 4, Kjels Nor 2.
Turdus pilaris. Graadyb 1, Lyngvig 1 (2 faldt).

23de April.

Graadyb. S. V. 3, Regnbyger. Smaafugle om Fyret; 1 Sangdrossel og 2 Stenpikkere faldt.

Vyl. S. V. 3, Regn. Endel Fugle ved Fyret om Natten; 1 Stær, 6 Sangdrosler og 2 Stenpikkere faldt; flere Fugle faldt i Vandet.

(1911.)

Lyngvig. S. V. 3, overtrukket. En Storspove faldt.

Rubjerg Knude. S. V. 4. Mange Regnspover om Fyret.

Læsø Trindel. V. S. V. 3, skyet. Enkelte Fugle ved Fyret; 1 Sangdrossel faldt.

Østre Flak. S. V. 2, overtrukket. En Rødkælk faldt.

Anholt Knob. S. V. 3, overtrukket. En Sangdrossel faldt.

Anholt. S. V. 4, diset. 2 Stære, 1 Jernspurv, 32 Sjaggere, 1 Ringdrossel, 1 Stenpikker, 3 Rødkælke og 1 Kvæker faldt.

Hesselø. V. S. V. 4. 1 Skovdue og 5 Vindrosler faldt (intet indsendt).

Sejrø. S. V. Regn, diset, af og til Taage. Endel Fugle omkring Ruderne; 4 Vindrosler og 1 Rødkælk faldt (intet indsendt).

Æbelø. S. V. Regnbyger og diset. Endel Drosler og mindre Fugle paa Ruderne; 4 Fugle faldt.

Hyllekrog. S. V. Flovt, diset. Endel Smaafugle paa Ruderne i Nattens Løb; 1 Rødkælk og 1 Kvæker faldt.

Numenius arquatus. Lyngvig 1.
Iynx torquilla. Æbelø 1.
Sturnus vulgaris. Vyl 1, Anholt 1 (2 faldt.).
Accentor modularis. Anholt 1.
Turdus musicus. Graadyb 1, Vyl 1 (6 faldt.), Læsø Trindel 1, Anholt Knob 1, Æbelø 1.
Turdus pilaris. Anholt 1 (32 faldt.).
Turdus torquatus. Anholt 1.
Saxicola oenanthe. Graadyb 2, Vyl 2, Anholt 1.
Erithacus rubecula. Østre Flak 1, Anholt 3, Hyllekrog 1.
Fringilla montifringilla. Anholt 1, Hyllekrog 1.

24de April.

Vyl. S. V. 3, Regnbyger. Enkelte Fugle ved Fyret om Natten; 2 faldt i Vandet.

Skagen. V. S. V. 4, Regn, diset. Store Mængder af Regnspover, Stære, Drosler m. fl. kredsede om Fyret og fløj mod Ruderne; 1 Storspove, 10 Drosler og 1 Broget Fluesnapper faldt.

Læsø Trindel. V. S. V. 3, Regnbyger. Endel Fugle ved Fyret; 8 Sangdrosler, 1 Solsort og 1 Ringdrossel faldt.

Læsø Rende. V. 5, Regnbyger. 3 Brogede Fluesnappere, 1 Stenpikker, 1 Rødkælk og 1 Rørspurv faldt.

(1911.)

Østre Flak. S. V. 2, overtrukket, Regn. Flere Fugle ved Fyret; 1 Vindrossel og 1 Sangdrossel faldt.

Anholt. S. V. 5, Dis og Regn. 1 Vendehals, 2 Lærker, 19 Sangdrosler, 6 Sjaggere, 1 Stenpikker og 1 Kvæker faldt; mange Fugle faldt i Søen.

Sprogø. V. S. V. 3, diset. 3 Vindrosler faldt (ikke indsendte.).

Numenius arquatus. Skagen 1.
Iynx torquilla. Anholt 1.
Alauda arvensis. Anholt 2.
Turdus iliacus. Skagen 2, Østre Flak 1.
Turdus musicus. Skagen 2, Østre Flak 1, Anholt 2 (19 faldt.).
Turdus pilaris. Skagen 1, Anholt 1 (6 faldt.).
Turdus merula. Læsø Trindel 1.
Turdus torquatus. Læsø Trindel 1.
Saxicola oenanthe. Læsø Rende 1, Anholt 1.
Erithacus rubecula. Læsø Rende 1.
Muscicapa atricapilla. Skagen 1, Læsø Rende 3.
Fringilla montifringilla. Anholt 1.
Emberiza schoeniclus. Læsø Rende 1.

25de April.

Lodbjerg. V. N. V. 2, overtrukket, Dis. 1 Lærke og 1 Solsort ved Ruderne om Morgenen.

Hesselø. V. S V. 2. 1 Sjagger og 4 Vindrosler faldt (intet indsendt.).

26de April.

Graadyb. S. V. 3, Regn. Nogle Fugle om Fyret; 1 Sjagger og 1 Stenpikker faldt.

Vyl. S. V. 2, Regn. Endel Fugle ved Fyret om Natten; 6 Sangdrosler og 2 Stenpikkere faldt.

Hanstholm. S. 2, Regndis. Nogle Regnspover hørtes omkring Fyret Kl. 12.

Nordre Rønner. S. 3, Regndis. 1 Vindrossel og 1 Lærke faldt (ikke indsendte).

Hesselø. V. 4. 6 Vindrosler faldt (ikke indsendte.).

Schultz's Grund. V. S. V. 2, Taage. 1 Vandrikse, 2 Lærker, 1 Løvsanger, 1 Fuglekonge, 4 Sangdrosler og 4 Rødkælke faldt.

Sejrø. V. S. V. Overtrukket og diset; af og til Taage. Endel Drosler og Smaafugle omkring Ruderne.

(1911.)

Vestborg. S. Dis. 2 Vindrosler faldt (ikke indsendte.)

Hammeren. S. V. 4, Taage og Regn. 1 Skovsneppe faldt.

Rallus aquaticus. Schultz's Grund 1.
Scolopax rusticula. Hammeren 1.
Alauda arvensis. Schultz's Grund 2.
Phyllopseustes trochilus. Schultz's Grund 1.
Regulus cristatus. Schultz's Grund 1.
Turdus musicus. Vyl 1 (6 faldt), Schultz's Grund 2 (4 faldt.).
Turdus pilaris. Graadyb 1.
Saxicola oenanthe. Graadyb 1, Vyl 2.
Erithacus rubecula. Schultz's Grund 4.

27de April.

Skagen. S. 3, Regn. Store Mængder af Regnspover, Drosler o. fl. a. kredsede om Fyret; 1 Vandrikse, 1 Mudderklire og 20 Sangdrosler faldt.

Nordre Røn. V. 4, Regnbyger. Flere Stære om Fyret.

Læsø Trindel. V. 3, Regntykning. Endel Fugle ved Fyret; 7 Sjaggere (Sangdrosler?), 1 Rødstjert og 1 Rødkælk faldt.

Læsø Rende. S. og V. 5, Regn. 1 Vendehals, 1 Vindrossel, 1 Sangdrossel og 1 Stenpikker faldt.

Østre Flak. S. S. V. 3, overtrukket og Regn. Mange Fugle saas ved Fyret; 1 Vendehals, 4 Sangdrosler, 1 Ringdrossel og 1 Rødkælk faldt.

Anholt Knob. V. 4, overtrukket, Regn; 15 Fugle faldt, 1 Vindrossel, 1 Sjagger og 5 Rødkælke indsendtes; mange faldt udenbords.

Hesselø. S. V. 3. 3 Vindrosler faldt (ikke indsendte.).

Fornæs. V. S. V. 3, Regn. Enkelte Drosler omkring Fyret; 3 faldt (ikke indsendte.).

Sejrø. V. N. V. Overtrukket. Nogle Fugle ved Ruderne hele Natten; 1 Vendehals, 2 Vindrosler, 1 Solsort, 1 Bynkefugl og 1 Rødkælk faldt.

Lappegrunden. S. V. 2, Regn. Endel Smaafugle ved Fyret.

Sprogø. Mange Smaafugle paa Ruderne.

Omø. V. til N. 3, skyet og Regn. 1 Vindrossel, 1 Sjagger og 1 Solsort faldt.

Rallus aquaticus. Skagen 1.
Actitis hypoleuca. Skagen 1.

Iynx torquilla. Læsø Rende 1, Østre Flak 1, Sejrø 1.
Turdus iliacus. Læsø Rende 1, Anholt Knob 1, Sejrø 2, Omø 1.
Turdus musicus. Skagen 1 (20 faldt), Læsø Rende 1, Østre Flak 4.
Turdus pilaris. Anholt Knob 1, Omø 1.
Turdus merula. Sejrø 1, Omø 1.
Turdus torquatus. Østre Flak 1.
Saxicola oenanthe. Læsø Rende 1.
Praticola rubetra. Sejrø 1.
Ruticilla phoenicura. Læsø Trindel 1.
Erithacus rubecula. Læsø Trindel 1, Østre Flak 1, Anholt Knob 5, Sejrø 1.

28de Aqril.

Lyngvig. N. Ø. 2. overtrukket. Endel Smaafugle om Fyret; 1 Rørvagtel, 1 Ryle og 1 Stenpikker faldt.

Lodbjerg. S. S. V. senere Ø. 2, overtr., Dis. 1 Ringdrossel og nogle Stenpikkere ved Ruderne om Natten; 2 Stenpikkere faldt.

Hanstholm. S. V. 2, Regndis. Nogle Ringdrosler, Vindrosler og Solsorter samt nogle Strandskader om Fyret fra Kl. 11 til Daggry.

Anholt Knob. S. S. V. 3, overtr., Regn. Enkelte Fugle ved Fyret; 1 Rødkælk faldt.

Schultz's Grund. V. 2, Regn. 10 Sangdrosler faldt paa Dækket, mange udenbords.

Vestborg. Ø. Regn. 1 Stær og 1 Vindrossel faldt (ikke indsendte.).

Stevns. S. 2, Regntykning. 1 Vindrossel, 1 Sangdrossel, 1 Sjagger og 1 Misteldrossel faldt.

Kjels Nor. S. 4, Regndis. 1 Vandrikse, 1 Enkelt Bekkasin, 1 Sivsanger, 9 Sangdrosler, 1 Sjagger og 1 Kvæker faldt.

Porzana maruetta. Lyngvig 1.
Rallus aquaticus. Kjels Nor 1.
Tringa alpina. Lyngvig 1.
Limnocryptes gallinula. Kjels Nor 1.
Sturnus vulgaris. (Vestborg 1.).
Acrocephalus phragmitis. Kjels Nor 1.
Turdus iliacus. Stevns 1.
Turdus musicus. Schultz's Grund 4 (10 faldt), Stevns 1, Kjels Nor 9.
Turdus pilaris. Stevns 1, Kjels Nor 1.
Turdus viscivorus. Stevns 1.
Saxicola oenanthe. Lyngvig 1, Lodbjerg 2.
Erithacus rubecula. Anholt Knob 1.
Fringilla montifringilla. Kjels Nor 1.

(1911.)

29de April.

Lodbjerg. V. S. V. 3, overtr., diset. Nogle Drosler og Stære ved Ruderne; 1 Præstekrave, 2 Sangdrosler og 1 Ringdrossel faldt.

Hanstholm. S. V. 2, Regn. Nogle Regnspover, Strandskader og Solsorter samt Ænder om Fyret fra Kl. 11 til Kl. 3; 1 Rørvagtel, 1 Ringdrossel og 1 Solsort faldt.

Østre Flak. S. V. 2, overtrukket. 1 Fuglekonge, 1 Sangdrossel, 3 Sjaggere og 1 Rødkælk faldt; mange faldt i Søen.

Fornæs. V. 3, Regn. Mange Drosler omkring Fyret; 24 faldt. 1 Skovdue faldt (ikke indsendt.).

Hyllekrog. V. og V. N. V., flovt. En lille Lappedykker faldt.

Tachybaptes minor. Hyllekrog 1.
Porzana maruetta. Hanstholm 1.
Ægialitis hiaticula. Lodbjerg 1.
Regulus cristatus. Østre Flak 1.
Turdus musicus. Lodbjerg 2, Østre Flak 1.
Turdus pilaris. Østre Flak 3.
Turdus torquatus. Lodbjerg 1, Hanstholm 1.
Turdus merula. Hanstholm 1.
Erithacus rubecula. Østre Flak 1.

30te April.

Lyngvig. S. S. V. 3, overtrukket. En Spurv faldt.

Lodbjerg. S. S. V. 3, overtrukket, diset. 1 Drossel og 1 Stenpikker ved Ruderne før Midnat; flere Drosler, Stenpikkere og Fluesnappere ved Ruderne efter Midnat.

Skagen. S. S. V. 3, overtrukket. Endel Drosler, Rødbryste, Rødstjerte o. fl. a. paa Ruderne; 20 Sangdrosler, 4 Sjaggere, 2 Stenpikkere, 1 Broget Fluesnapper og 1 Rørspurv faldt.

Læsø Trindel. S. V. 2, Regn og overtrukket. Endel Fugle ved Fyret; 6 Sjaggere (Sangdrosler?) og 2 Rødkælke faldt.

Anholt Knob. V. 4, overtrukket, Regnbyger. Enkelte Smaafugle ved Fyret; en Rødkælk faldt.

Æbelø. S. V. 3, diset og Regn. Endel Kramsfugle samt andre Smaafugle paa Ruderne; 1 Enkelt Bekkasin faldt.

Limnocryptes gallinula. Æbelø 1.
Turdus musicus. Skagen 1 (20 faldt.).

Turdus pilaris. Skagen 1 (4 faldt.).
Saxicola oenanthe. Skagen 2.
Erithacus rubecula. Læsø Trindel 2, Anholt Knob 1.
Muscicapa atricapilla. Skagen 1.
Passer domesticus. Lyngvig 1.
Emberiza schoeniclus. Skagen 1.

1ste Maj.

Skagen. V. 3, byget. Flere Slags Smaafugle paa Ruderne.

2den Maj.

Lyngvig. V. 2, skyet. 4 Sangdrosler og 1 Rødstjert faldt.

Kjels Nor. S. Ø. 3, overtrukket, Regn. 1 Munk faldt.

Sylvia atricapilla. Kjels Nor 1.
Turdus musicus. Lyngvig 1 (4 faldt.).
Ruticilla phoenicura. Lyngvig 1.

3dje Maj.

Blaavands Huk. S. S. Ø. 1, Regntykning. 2 Drosler faldt (ingen indsendt.).

Vyl. S. V. 3, Regn. Endel Fugle om Fyret; 1 Ringdrossel faldt.

Lyngvig. S. Ø. 2, Regn. 1 Horsegøg og 1 Broget Fluesnapper faldt.

Lodbjerg. S. 3, Regn, Dis. Drosler, Fluesnappere, Stære, Lærker og Stenpikkere ved Ruderne om Natten; 1 Vendehals, 1 Broget Fluesnapper, 1 Sangdrossel og 1 Stenpikker faldt.

Hanstholm. S. 2, Regn. Endel Sangdrosler, Ringdrosler og andre Smaafugle om Fyret fra Kl. 11 til Daggry; 1 Vendehals, 2 Sangdrosler og 3 Stenpikkere faldt.

Læsø Rende. S. 3, Regnbyger. 2 Rødkælke faldt.

Sprogø. S. 3, diset. 1 Rødkælk faldt (ikke indsendt.).

Kjels Nor. S. S. Ø. 3, overtrukket; 1 Vendehals faldt.

Gallinago scolopacina. Lyngvig 1.
Iynx torquilla. Lodbjerg 1, Hanstholm 1, Kjels Nor 1.
Turdus musicus. Lodbjerg 1, Hanstholm 2.
Turdus torquatus. Vyl 1.
Saxicola oenanthe. Lodbjerg 1, Hanstholm 3.
Erithacus rubecula. Læsø Rende 2.
Muscicapa atricapilla. Lyngvig 1, Lodbjerg 1.

4de Maj.

Graadyb. S. S. V. 4, Regn. Mange Fugle om Skibet; 1 Stenpikker faldt.

(1911.)

Lodbjerg. S. S. V. 6, overtrukket, Dis, Regn. 1 Stær og 1 Fluesnapper ved Ruderne efter Midnat.

Skagen. S. 5, overtrukket. 2 Vindrosler, 1 Vadefugl o. fl. a. paa Ruderne; 2 Drosler, 1 Rørvagtel og 1 Horsegøg faldt.

Porzana maruetta. Skagen 1.
Gallinago scolopacina. Skagen 1.
Saxicola oenanthe. Graadyb 1.

5te Maj.

Anholt Knob. Stille, skyet. Flokke af Regnspover trak forbi Skibet om Natten.

13de Maj.

Vyl. Stille, klart. 1 Bynkefugl og 2 Rødstjerte faldt.

Praticola rubetra. Vyl 1.
Ruticilla phoenicura. Vyl 2.

15de Maj.

Graadyb. S. 2, Regnbyger. 1 Rødben faldt.

Skagen. Ø. S. Ø. 4, Regn. Endel Rødstjerte, Digesmutter o. a. Smaafugle paa Ruderne; 1 Vendehals, 1 Tornsanger og 1 Graa Fluesnapper faldt.

Totanus calidris. Graadyb 1.
Iynx torquilla. Skagen 1.
Sylvia cinerea. Skagen 1.
Muscicapa grisola. Skagen 1.

16de Maj.

Vyl. V. 2, Taage. En Rødstjert faldt.

Østre Flak. S. Ø. 1, overtr. og Regn. 1 Løvsanger, 1 Broget Fluesnapper og 1 Rødstjert faldt.

Phyllopseustes trochilus. Østre Flak 1.
Muscicapa atricapilla. Østre Flak 1.
Ruticilla phoenicura. Vyl 1, Østre Flak 1.

19de Maj.

Læsø Rende. S. 2, byget. En Bynkefugl og 1 Broget Fluesnapper faldt.

Praticola rubetra. Læsø Rende 1.
Muscicapa atricapilla. Læsø Rende 1.

24de Maj.

Skagen. S. V. 3, overtrukket. Flere Smaafugle kredsede om Taarnet.

(1911.)

25de Maj.

Lyngvig. V. 2, Taage. Endel Smaafugle om Fyret; 1 Graa Fluesnapper faldt.

Sejrø. S. Ø. Regntykning. Endel Smaafugle ved Ruderne.

Vestborg. S. Taage. 1 Kongefugl, 2 Havesangere og 1 Gærdesmutte faldt (intet indsendt.).

Kjels Nor. S. 2, Regndis. 1 Munk, 2 Havesangere, 1 Rørsanger, 1 Løvsanger, 1 Sydlig Nattergal og 1 Broget Fluesnapper faldt.

Hyllekrog. S. Ø. Flovt og Regntykning. Mange Smaafugle paa Ruderne; 1 Gulbug faldt.

Sylvia atricapilla. Kjels Nor 1.
Sylvia hortensis. Kjels Nor 2.
Hypolais icterina. Hyllekrog 1.
Acrocephalus arundinaceus. Kjels Nor 1.
Phyllopseustes trochilus. Kjels Nor 1.
Luscinia vera. Kjels Nor 1.
Muscicapa grisola. Lyngvig 1.
Muscicapa atricapilla. Kjels Nor 1.

24de Juli.

Omø. Stille, skyet. En Brevdue faldt.

Columba livia dom. 1.

21de August.

Nakkehoved. N. Ø. 3, diset. 1 Vendehals faldt.

Iynx torquilla 1.

22de August.

Lyngvig. Ø. 2, overtrukket. Smaafugle om Fyret; 1 Islandsk Ryle og 1 Rødstjert faldt.

Gedser Rev. S. Ø. 2, Regn. 1 Stær og 2 Rødkælke ved Fyret.

Tringa canutus. Lyngvig 1.
Ruticilla phoenicura. Lyngvig 1.

23de August.

Stevns. N. Ø. 3, Regntykning. 1 Vendehals faldt.

Gedser Rev. N. V. 2, Regn. 2 Regnspover ved Fyret.

Iynx torquilla. Stevns 1.

(1911.)

26de August.

Lyngvig. V. S. V. 2, overtrukket. 1 Islandsk Ryle faldt.

Stevns. V. S. V. 4. 2 Drosler og 1 Lærke faldt (ikke indsendte.).

Tringa canutus. Lyngvig 1.

27de August.

Læsø Rende. V. 2, Regnbyger. Flere Fugle ved Fyret, nogle faldt i Vandet.

28de August.

Hanstholm. N. Ø. 2, Regn. En Mængde Smaafugle omkring Fyret fra Kl. 11 til Kl. 4.

Rubjerg Knude. N. V. 3, Regn. Mange Smaafugle omkring Fyret: 1 Pomeransfugl, 1 Rødben, 1 Lærke, 3 Havesangere, 9 Løvsangere og 1 Rødstjert faldt.

Hirtshals. S. V. 1 — V. 2. 1 Tornsanger, 1 Havesanger, 8 Løvsangere og 1 Rødstjert faldt.

Skagen. V. S. V. 3, Regn og Dis. Havesangere, Irisker, Stenpikkere, Rødbryste og mange andre Slags Fugle paa Ruderne; omkr. 70 faldt, deriblandt 3 Tornsangere, 2 Havesangere, 26 Løvsangere, 6 Rødstjerte og 16 Brogede Fluesnappere.

Læsø Trindel. V. S. V. 3, Regn. Endel Smaafugle ved Fyret; 2 Løvsangere og 1 Rødstjert faldt.

Eudromias morinellus. Rubjerg Knude 1.
Totanus calidris. Rubjerg Knude 1.
Alauda arvensis. Rubjerg Knude 1
Sylvia cinerea. Hirtshals 1, Skagen 2 (3 faldt.).
Sylvia hortensis. Rubjerg Knude 3, Hirtshals 1, Skagen 2.
Phyllopseustes trochilus. Rubjerg Knude 9, Hirtshals 8, Skagen 4 (26 faldt.), Læsø Trindel 2.
Ruticilla phoenicura. Rubjerg Knude 1, Hirtshals 1, Skagen 6, Læsø Trindel 1.
Muscicapa atricapilla. Skagen 4 (16 faldt.).

29de August.

Vyl. S. V. 3, Regnbyger. En stor Flok Strandfugle kom om Natten flyvende fra Ø. mod Fyret; Flokken vendte straks og fløj indad igen; 1 Selning faldt.

Lyngvig. S. V. 2, Regn. Endel Hjejler og andre Smaafugle om Fyret; 1 Islandsk Ryle, 1 Lærke og 1 Høgesanger faldt.

Lodbjerg. S. 2, overtrukket, Regn og Dis. Nogle Fluesnappere og Stenpikkere ved Ruderne efter Midnat.

Læsø Rende. V. 2, byget. 1 Strandryle faldt (ikke indsendt.).

Tringa canutus. Lyngvig 1.
Calidris arenaria. Vyl 1.
Alauda arvensis. Lyngvig 1.
Sylvia nisoria. Lyngvig 1.

31te August.

Lyngvig. N. V. 5, skyet. En Krikand faldt.

Læsø Rende. V. 2, byget. En ubekendt Fugl faldt (ikke indsendt.).

Anas crecca. Lyngvig 1.

1ste September.

Bovbjerg. S. V. 5, Regn. Enkelte Smaafugle om Fyret; 1 Vildand og 1 Sneppe faldt (ikke indsendte.).

Fornæs. S. V. 3, Regn. Enkelte Smaafugle om Fyret; 1 Islandsk Ryle faldt.

Tringa canutus. Fornæs 1.

6te September.

Vyl. N. V. 4, graat. En Engpiber faldt.

Anthus pratensis 1.

11te September.

Vyl. S. V. 2, klart. En Stenpikker opholt sig paa Dækket imorges og fandtes henimod Aften død i en Krog.

Saxicola oenanthe 1.

16de September.

Anholt Knob. N. 6, skyet. En Gærdesmutte faldt.

Troglodytes parvulus 1.

17de September.

Hammeren. V. S. V. 3, klart. Omkring 20 Strandskader saas flyve om Fyret; 1 faldt.

Hæmatopus ostreologus 1.

(1911.)

18de September.

Hammeren. N. V. 5, diset. En Rødkælk saas paa Ruderne.

20de September.

Skagen. S. V. 3, overtrukket. Endel Smaafugle paa Ruderne; 1 Digesmutte faldt (ikke indsendt).

23de September.

Omø. Stille, skyet, Dis. Enkelte Fuglekonger ved Fyrruderne.

Gedser. N. N. Ø. overtrukket, fin Regn. 1 Sangdrossel faldt; der fandtes kun denne ene Fugl.

Turdus musicus. Gedser 1.

24de September.

Graadyb. Ø. Overtrukket, Regn. Endel Smaafugle om Fyret; 1 Stenpikker faldt.

Blaavands Huk. Ø. 2, Regntykning. Mange Smaafugle ved Fyret; 6 Lærker, 2 Drosler, 3 Fuglekonger og 3 Rødkælke faldt (intet indsendt).

Vyl. Ø. 2, Regn. 6 Lærker, 1 Munk, 1 Havesanger, 2 Løvsangere, 2 Sangdrosler, 2 Skovpibere, 10 Stenpikkere, 2 Rødkælke og 1 Broget Fluesnapper faldt.

Horns Rev. S. Overtrukket. Enkelte Smaafugle ved Fyret om Natten.

Lodbjerg. Ø. N. Ø. 2, overtrukket, Dis. Nogle Rødstjerte, Fluesnappere og 1 Fuglekonge ved Ruderne efter Midnat; 1 Løvsanger, 1 Stenpikker, 2 Rødstjerte og 1 Kvæker faldt.

Hanstholm. Ø. N. Ø. 2, graat. Endel Smaafugle omkring Fyret fra Kl. 1 til Daggry; 1 Havesanger, 1 Ringdrossel, 2 Stenpikkere og 2 Rødkælke faldt.

Skagen. Ø. S. Ø. 3, overtrukket. Store Mængder af Rødbryste, Rødstjerter, Kvækere, Havesangere, Irisker og Fuglekonger paa Ruderne; 1 Rødstjert, 1 Kvæker, 1 Havesanger og 1 Sjagger faldt (intet indsendt).

Skagens Rev. S. Ø. 2, overtrukket. Enkelte Smaafugle ved Fyret om Natten; 1 Rødkælk faldt.

Læsø Trindel. Ø. 3, skyet. Enkelte Fugle ved Fyret; 1 Rødkælk faldt.

Anholt Knob. Ø. 4, overtrukket. Fugle ved Fyret hele Natten; 1 Stenpikker og 1 Rørspurv faldt.

Romsø. S. til N. V. med Dis og Regn mellem Kl. 8 Eftm. og Kl. 4 Form. Mange Smaafugle om Fyret; deriblandt Havesanger, Rødkælk og Graa Digesmutte; ingen faldt.

Omø. Ø. 5, klart og diset. Flere Smaafugle ved Fyrruderne.

Alauda arvensis. Vyl 6.
Sylvia atricapilla. Vyl 1.
Sylvia hortensis. Vyl 1, Hanstholm 1.
Phyllopseustes trochilus. Vyl 2, Lodbjerg 1.
Anthus arboreus. Vyl 2.
Turdus musicus. Vyl 2.
Turdus torquatus. Hanstholm 1.
Saxicola oenanthe. Graadyb 1, Vyl 10, Lodbjerg 1, Hanstholm 2, Anholt Knob 1.
Ruticilla phoenicura. Lodbjerg 2.
Erithacus rubecula. Vyl 2, Hanstholm 2, Læsø Trindel 1.
Muscicapa atricapilla. Vyl 1.
Fringilla montifringilla. Lodbjerg 1.
Emberiza schoeniclus. Anholt Knob 1.

25de September.

Graadyb. V. Overtrukket. Enkelte Fugle om Fyret; 1 Løvsanger og 1 Fuglekonge faldt.

Blaavands Huk. Stille, Smaaregn og diset. Mange Smaafugle ved Fyret; 8 Drosler og 1 Regnspove faldt (intet indsendt.).

Vyl. Stille, klart. Viber og flere andre Fugle om Fyret; 5 Kramsfugle faldt (ikke indsendte.).

Bovbjerg. S. S. V. til N. V. 2, Taage. Endel Lærker, Finker og Kramsfugle om Fyret, enkelte faldt (ingen indsendt.).

Lodbjerg. Ø. N. Ø. senere N. V. 2, overtrukket, Taage. 1 Ringdrossel, 1 Vindrossel og forskellige Smaafugle ved Ruderne om Natten; 1 Strandhjejle og 1 Sangdrossel faldt.

Læsø Rende. S. S. Ø. Skyet. Enkelte Fugle ved Fyret, 1 Sangdrossel og 1 Stenpikker faldt.

Østre Flak. S. S. Ø. 1, overtrukket, Regn. Flere Fugle ved Fyret; 1 Sangdrossel, 1 Stenpikker og 1 Rødstjert faldt.

(1911.)

Anholt Knob. S. Ø. 2, overtrukket. Fugle omkring Fyret: 1 Havesanger faldt.

Schultz's Grund. 1 Stær, 1 Stenpikker, 1 Rødstjert og 2 Rødkælke faldt.

Sejrø. S. Ø. Regndis. Endel Smaafugle samt store Flokke af Viber omkring Fyret.

Kjels Nor. V. S. V. 2, Regndis. 1 Horsegøg, 3 Havesangere, 2 Munke, 1 Træpiber, 1 Sangdrossel, 2 Stenpikkere, 2 Rødstjerte, 9 Rødkælke og 1 Broget Fluesnapper faldt; mange flere faldt, men toges af omstrejfende Katte.

Gedser. V. N. V. Tykning og Regn. En Mængde smaa Fugle om Fyret. 1 Havesanger og 1 Sivsanger faldt.

Gedser Rev. V. N. V. 3, Regn, Taage. Omkring 20 Fugle om Fyret: 1 Munk, 1 Løvsanger, 1 Stenpikker, 1 Rødstjert og 5 Rødkælke faldt.

Hyllekrog. Stille, flovt. Overtrukket og Tykning. Mange Smaafugle flagrede paa Ruderne og i Fyrets Straaler; ingen faldt.

Charadrius squatarola. Lodbjerg 1.
Gallinago scolopacina. Kjels Nor 1.
Sturnus vulgaris. Schultz's Grund 1.
Sylvia hortensis. Anholt Knob 1, Kjels Nor 3, Gedser 1.
Sylvia atricapilla. Kjels Nor 2, Gedser Rev 1.
Acrocephalus phragmitis. Gedser 1.
Phyllopseustes trochilus. Graadyb 1, Gedser Rev 1.
Regulus cristatus. Graadyb 1.
Anthus arboreus. Kjels Nor 1.
Turdus musicus. Lodbjerg 1, Læsø Rende 1, Østre Flak 1, Kjels Nor 1.
Saxicola oenanthe. Læsø Rende 1, Østre Flak 1, Schultz's Grund 1, Kjels Nor 2, Gedser Rev 1.
Ruticilla phoenicura. Østre Flak 1, Schultz's Grund 1, Kjels Nor 2, Gedser Rev 1.
Erithacus rubecula. Schultz's Grund 2, Kjels Nor 9, Gedser Rev 5.
Muscicapa atricapilla. Kjels Nor 1.

26de September.

Læsø Rende. V. Skyet. 1 Rødkælk faldt.

Østre Flak. S. S. V. 3, skyet. Flere Fugle ved Fyret; 1 Stenpikker, 1 Rødkælk og 1 Blaakælk faldt.

(1911.)

Anholt Knob. V. S. V. 3, skyet. 1 Rødkælk faldt og fangedes af Hunden.

Saxicola oenanthe. Østre Flak 1.
Erithacus rubecula. Læsø Rende 1, Østre Flak 1, Anholt Knob 1.
Cyanecula suecica. Østre Flak 1.

27de September.

Skagen. S.V. 4, overtrukket. 1 Rødstjert og 1 Havesanger paa Ruderne.

Læsø Trindel. S. V. 3, skyet. Enkelte Fugle ved Fyret, 1 Rødstjert faldt.

Ruticilla phoenicura. Læsø Trindel 1

28de September.

Lodbjerg. V. N. V. 5, Regntykning. Mange Viber kredsede om Fyret efter Midnat.

Skagen. S. V. 4, Regn. 2 Dobbelte Bakkasiner og 1 Digesmutte faldt.

Hammeren. S. V. 3, diset. Endel Smaafugle paa Ruderne; 10 Kongefugle, 3 Rødkælke og 1 Stær saas.

29de September.

Hesselø. Ø. S. Ø. 3, diset. 35 Vindrosler og endel Lærker faldt (intet indsendt).

30te September.

Anholt Knob. V. N. V. 3, skyet. 1 Rødkælk faldt.

Hammeren. S. Ø. 3, klart. Endel Smaafugle paa Ruderne. 2 Kærsangere, 2 Nattergale og 1 Drossel saas; 1 Kærsanger faldt (ikke indsendt.).

Erithacus rubecula. Anholt Knob 1.

1ste Oktober.

Graadyb. Ø. N. Ø. Overtrukket, Regn. Enkelte Fugle om Fyret; 1 Sangdrossel faldt.

Østre Flak. N. Ø. 4, overtrukket. 1 Lærke faldt.

Anholt. Ø. 3, overtrukket. Mange Smaafugle ved Ruderne; 3 Lærker, 1 Gransanger, 1 Stenpikker, 2 Rødkælke, 4 Kvækere og 7 Rørspurve faldt.

(1911.)

Schultz's Grund. 2 Lærker, 13 Sangdrosler og 6 Rødkælke faldt.

Hjelm. Ø. S. Ø. 3, Regn. Mange Fugle ved Ruderne; 11 Lærker faldt (ikke indsendte.).

Sejrø. Ø. S. Ø. Regndiset. Flere Hundrede Fugle omkring Fyret; 12 Lærker, 10 Rødkælke og omtr. 100 Vindrosler faldt (intet insendt.).

Gedser Rev. Ø. S. Ø. 5, Regn. 1 Ringdrossel og 6 Sangdrosler faldt.

Alauda arvensis. Østre Flak 1, Anholt 3, Schultz's Grund 2.
Phyllopseustes rufus. Anholt 1.
Turdus musicus. Graadyb 1, Schultz's Grund 13, Gedser Rev 6.
Turdus torquatus. Gedser Rev 1.
Saxicola oenanthe. Anholt 1.
Erithacus rubecula. Anholt 2, Schultz's Grund 6.
Fringilla montifringilla. Anholt 4.
Emberiza schoeniclus. Anholt 7.

2den Oktober.

Anholt Knob. N. Ø. 7, Regn. 1 Drossel faldt.

Anholt. Ø. 7, Regn. 1 Hjejle, 3 Ringduer, og 56 Sangdrosler faldt.

Charadrius pluvialis. Anholt Knob 1.
Columba palumbus. Anholt 1 (3 faldt).
Turdus musicus. Anholt 3 (56 faldt.).

3dje Oktober.

Vyl. N. 3, klart. Mange Smaafugle ved Fyret; 1 Ringdrossel faldt.

Rubjerg Knude. S. Ø. 3, Regn. Flere Smaafugle om Fyret; 1 Drossel faldt (ikke indsendt.).

Turdus torquatus. Vyl 1.

4de Oktober.

Horns Rev. N. V. Regnbyger. Enkelte Fugle ved Fyret om Natten.

Hanstholm. Ø. S. Ø. 2, graat, Regnbyger. Enkelte Ringdrosler og Vindrosler om Fyret.

6te Oktober.

Graadyb. Ø. klart. 1 Stær faldt.

Sturnus vulgaris 1.

7de Oktober.

Vyl. Ø. S. Ø. 3, skyet. Endel Fugle om Fyret; 1 Lærke og 1 Solsort faldt.

Alauda arvensis 1.
Turdus merula 1.

8de Oktober.

Lyngvig. N. Ø. 3, Regn. Endel Drosler og andre Smaafugle om Fyret; 2 faldt.

Lodbjerg. N. Ø. 2, overtrukket, Dis. 1 Stenpikker ved Ruderne efter Midnat.

Fringilla montifringilla. Lyngvig 1.

9de Oktober.

Vyl. N. N. Ø. 3, skyet. Flere Smaafugle ved Fyret; 1 Engpiber og 1 Bogfinke faldt.

Anthus pratensis 1.
Fringilla coelebs 1.

10de Oktober.

Skagen. V. N. V. 2, skyet. En Kongefugl paa Ruderne.

Anholt Knob. N. V. 3, overtrukket. Forskellige Fugle opholdt sig paa Skibet; 1 faldt.

Regulus cristatus. Anholt Knob 1.

11te Oktober.

Vyl. N. N. V. 3, skyet. Enkelte Smaafugle ved Fyret; 1 Rødkælk faldt.

Anholt Knob. N. V. 5, skyet. 1 Skovspurv faldt; flere opholdt sig paa Dækket hele Dagen.

Erithacus rubecula. Vyl 1.
Passer montanus. Anholt Knob 1.

14de Oktober.

Vyl. N. N. Ø. 2, tætskyet. 1 Bogfinke faldt.

Hammeren. N. N. V. 2, overtrukket. Omkring 30 Kongefugle saas paa Ruderne.

Fringilla coelebs. Vyl 1.

(1911.)

15de Oktober.

Graadyb. Ø. klart. 1 Stær, 1 Vindrossel og 1 Irisk faldt.

Sejrø. Ø. S. Ø. Af og til overtrukket. Enkelte Drosler ved Fyret; 3 Vindrosler faldt.

Sprogø. Ø. S. Ø. 4, Regndis. 1 Sangdrossel faldt (ikke indsendt).

Sturnus vulgaris. Graadyb 1.
Turdus iliacus. Graadyb 1.
Cannabina linota. Graadyb 1.

19de Oktober.

Lyngvig. Ø. N. Ø. 2, Taage. Stære og andre Smaafugle om Fyret; 1 Gærdesmutte faldt.

Skagen. Ø. 2, klart. 1 Havesanger paa Ruderne.

Troglodytes parvulus. Lyngvig 1.

20de Oktober.

Vyl. Ø. 2, skyet. Flere Smaafugle ved Fyret om Natten; 2 Drosler faldt, den ene i Vandet og en Sortdrossel paa Dækket, hvor den opholdt sig hele Formiddagen og fløj da mod V.

Læsø Trindel. S. 3, Regnbyger. Endel Fugle om Fyret; 6 Vindrosler, 2 Rødkælke og 2 Kvækere faldt.

Anholt Knob. 2. Taage. 1 Gulspurv faldt.

Romsø. S. V. og Dis mellem Kl. 8 og Kl. 12 Eftm. Mange smaa Fugle om Fyret; ingen faldt.

Turdus iliacus. Læsø Trindel 6.
Erithacus rubecula. Læsø Trindel 2.
Fringilla montifringilla. Læsø Trindel 2.
Emberiza citrinella. Anholt Knob 1.

21de Oktober.

Lodbjerg. S. Ø. 2, overtrukket, Taage. Viber hørtes i Taarnets Nærhed før Midnat. Efter Midnat S. 2. En Drossel kom ved Ruderne.

Hanstholm. S. Ø. 2, Taage. Endel Vindrosler omkring Fyret fra Kl. 11 til Dag.

Skagen. S. Stille og 2, Taage og Regn. Store Mængder af Vindrosler og andre Smaafugle paa Ruderne; 21 Drosler og 2 Kvækere faldt (ikke indsendte).

(1911.)

Gedser Rev. S. V. 2, diset. Omkring 10 Lærker og 1 Rødkælk ved Fyret.

22de Oktober.

Skagen. S. 2 og 4, Taage. Endel Vindrosler, Rødkælke m. fl. paa Ruderne; 3 Drosler og 1 Kvæker faldt (ikke indsendte.).

Gedser Rev. S. Ø. 3, klart. 3 Fuglekonger ved Fyret; 1 faldt paa Dækket (ikke indsendt.).

23de Oktober.

Skagen. N. Ø. 2, Regn og overtrukket. Store Mængder af Rødkælke; enkelte Drosler, Kongefugle og andre Smaafugle paa Ruderne. 4 Drosler og 1 Lærke faldt (ikke indsendte.).

24de Oktober.

Blaavands Huk. V. 4, Regntykning. Mange Smaafugle ved Fyret; 75 Drosler, 1 Solsort og 2 Stære faldt (intet indsendt.).

Vyl. V. 5, Regnbyger. Nogle Smaafugle ved Fyret om Natten; 2 Vindrosler faldt.

Lyngvig. Stille, overtrukket, Regn. 1 Stenpiber, 68 Vindrosler, 1 Rødkælk og 1 Kvæker faldt.

Lodbjerg. N. 2, overtrukket, Dis. Nogle Fuglekonger ved Ruderne om Morgenen.

Skagen. S. Ø. 5, Regn. Endel Vindrosler paa Ruderne; 5 Drosler og 1 Stær faldt (ikke indsendte.).

Læsø Trindel. S. 4, Regn. Fugle om Fyret. 14 faldt.

Anholt Knob. V. N. V. 7, skyet. Enkelte Smaafugle ved Fyret; ingen faldt.

Gedser. V. Af og til Regnbyger. 1 Vindrossel faldt.

Alauda arvensis. Læsø Trindel 1.
Sturnus vulgaris. (Blaavands Huk 2).
Anthus obscurus. Lyngvig 1.
Turdus iliacus. Vyl 1, Lyngvig 1 (68 faldt.), Læsø Trindel 6, Gedser 1.
Turdus musicus. Læsø Trindel 1.
Turdus merula. Læsø Trindel 2.
Erithacus rubecula. Lyngvig 1, Læsø Trindel 3.
Fringilla montifringilla. Lyngvig 1, Læsø Trindel 1.

(1911.)

25de Oktober.

Graadyb. S. Overtrukket, Regn. Enkelte Smaafugle om Fyret.

Blaavands Huk. S. V. 5, Regn. 3 Drosler og 2 Stære faldt (ikke indsendte.).

Vyl. S. V. 3, Regn. Endel Drosler, Stære og Lærker saas ved Fyret om Aftenen; 1 Stær, 1 Vindrossel og 1 Sjagger faldt.

Horns Rev. S. S. V. Regn. Omkr. 100 Smaafugle ved Fyret om Natten; 12 Vindrosler og 1 Sangdrossel faldt.

Bovbjerg. S. Ø.—S. 8, Taage, Regn. En Mængde Kramsfugle og Stære om Fyret hele Natten; i Tusinder trak de mod S. i Nattens Løb.

Lodbjerg. S. 6, overtrukket, Regn og Dis. Mange Drosler og Stære ved Ruderne om Natten; 2 Lærker, 2 Stære, 14 Vindrosler og 1 Sangdrossel faldt.

Hanstholm. S. Ø. 2, Taage og Regn. Endel Vindrosler, Solsorter og enkelte Smaafugle om Fyret fra Kl. 10 til Dag.

Rubjerg Knude. Ø. 4, Regn. Mange Smaafugle om Fyret; 1 Stær, 10 Vindrosler og 1 Solsort faldt.

Læsø Rende. S. 5, Regn. Mange Fugle ved Fyret; mange faldt i Vandet.

Østre Flak. S. S. Ø. 4, overtrukket og Regn. Mange Fugle ved Fyret; 2 Lærker, 1 Fuglekonge, 10 Vindrosler, 5 Sangdrosler, 1 Solsort, 2 Rødkælke og 1 Kvæker faldt; endel faldt i Søen.

Anholt Knob. S. 5, overtrukket, Regn. En Mængde Fugle saas omkring Fyret; 3 Lærker, 1 Stær, 1 Vindrossel og 1 Misteldrossel faldt.

Anholt. S. S. Ø. 3, overtrukket, Regn. 88 Lærker, 36 Drosler (Vindrosler og Sangdrosler), 1 Kvæker og 2 Rørspurve faldt.

Hesselø. V. S. V. 4, Regn, Dis. 40 Vindrosler, 2 Solsorter og endel Lærker faldt (intet indsendt.).

Schultz's Grund. S. S. V. 3, overtrukket. 7 Lærker, 1 Stær, 21 Vindrosler, 1 Solsort og 1 Snespurv faldt.

Hammeren. S. S. V. 4, diset, overtrukket. Omkr. 20 Kongefugle paa Ruderne.

(1911.)

Gedser Rev. S. S. V. 3, klart. Ingen Fugle ved Fyret; 1 Fuglekonge faldt paa Dækket (ikke indsendt.).

Alauda arvensis. Lodbjerg 2, Østre Flak 2, Anholt Knob 3, Anholt 16 (88 faldt.), Schult'z Grund 4 (7 faldt.).

Sturnus vulgaris. (Blaavands Huk 2.), Vyl 1, Lodbjerg 2, Rubjerg Knude 1, Anholt Knob 1, Schultz's Grund 1.

Regulus cristatus. Østre Flak 1.

Turdus iliacus. Vyl 1, Horns Rev 12, Lodbjerg 14, Rubjerg Knude 10, Østre Flak 10, Anholt Knob 1, Anholt 1 (ca. 18 faldt), Schultz's Grund 5 (21 faldt.).

Turdus musicus. Horns Rev 1, Lodbjerg 1, Østre Flak 5, Anholt 1 (c. 18 faldt.).

Turdus pilaris. Vyl 1.

Turdus viscivorus. Anholt Knob 1.

Turdus merula. Rubjerg Knude 1, Østre Flak 1, (Hesselø 2), Schultz's Grund 1.

Erithacus rubecula. Østre Flak 2.

Fringilla montifringilla. Østre Flak 1, Anholt 1.

Emberiza schoeniclus. Anholt 2.

Emberiza nivalis. Schultz's Grund 1.

26de Oktober.

Lyngvig. N.V. 3, overtr. Enkelte Drosler om Fyret; 1 Vindrossel faldt.

Stevns. S. V. 4, Regntykning. 1 Lærke og 2 Vindrosler faldt.

Alauda arvensis. Stevns 1.

Turdus iliacus. Lyngvig 1, Stevns 2.

27de Oktober.

Graadyb. S. V. Regn og Hagelbyger. Endel Fugle om Fyret; 1 Lærke, 4 Vindrosler, 2 Sangdrosler og 1 Sjagger faldt.

Blaavands Huk. S., S. V. 5, Regn og Torden. 36 Drosler og 1 Stær faldt (intet indsendt.).

Vyl. Ø. S. Ø. 4, Regnbyger. Mange Smaafugle ved Fyret om Natten; 3 Lærker og 26 Drosler faldt; flere faldt i Vandet.

Horns Rev. 3, Regn. Flere Hundrede Smaafugle ved Fyret om Natten; 70 faldt paa Dækket, ligesaamange udenbords; 3 Lærker, 8 Vindrosler og 1 Kvæker indsendtes.

Lyngvig. S. V. 5, Regnbyger. Mange Drosler om Fyret; 1 Lærke, 327 Vindrosler og 1 Kvæker faldt.

(1911.)

Hanstholm. Ø. N. Ø. 5, Regn og Sne. En Sneppe fløj omkring Ruderne Kl. 2.

Anholt Knob. S. 4, overtrukket, Regn. Flere Fugle saas ved Fyret om Natten; 1 Lærke, 1 Rødkælk og 1 Snespurv faldt.

Anholt. Ø. 2, Regn. 2 Lærker, 142 Vindrosler, 3 Kvækere og 1 Snespurv faldt.

Hesselø. S. V. 4, Regndis. 10 Vindrosler og 3 Solsorter faldt (intet indsendt.).

Schultz's Grund. S. V. 3, Regn. 1 Solsort og 1 Rødkælk faldt.

Gedser Rev. S. V. 2, Regn. Enkelte Stære og Solsorter ved Fyret.

Alauda arvensis. Graadyb 1, Vyl 3, Horns Rev 3, Lyngvig 1, Anholt 2, Anholt Knob 1.

Sturnus vulgaris. (Blaavands Huk 1.).

Turdus iliacus. Graadyb 4, Vyl 1, Horns Rev 8, Lyngvig 1 (327 faldt.), Anholt 13 (142 faldt.).

Turdus musicus. Graadyb 2, Vyl 1.

Turdus pilaris. Graadyb 1, Vyl 1.

Turdus merula. Schultz's Grund 1, (Hesselø 3.).

Erithacus rubecula. Anholt Knob 1, Schultz's Grund 1.

Fringilla montifringilla. Horns Rev 1, Lyngvig 1, Anholt 3.

Emberiza nivalis. Anholt 1, Anholt Knob 1.

28de Oktober.

Vyl. N. Ø. 6, Regnbyger. Enkelte Smaafugle ved Fyret; 3 faldt.

Lyngvig. N. Ø. 2, skyet. En Del Lærker og Drosler om Fyret; 10 Lærker, 1 Vindrossel og 1 Snespurv faldt.

Kjels Nor. S. V. 2, Regn. 20 Vindrosler, 2 Sangdrosler og 2 Rødkælke faldt.

Gedser Rev. N. 3, Regnbyger. Enkelte store Kramsfugle ved Fyret.

Alauda arvensis. Lyngvig 1 (10 faldt.).

Turdus iliacus. Vyl 1, Lyngvig 1, Kjels Nor 20.

Turdus musicus. Kjels Nor 2.

Erithacus rubecula. Kjels Nor 2.

Fringilla montifringilla. Vyl 1.

Emberiza nivalis. Vyl 1, Lyngvig 1.

29de Oktober.

Blaavands Huk. N. Ø. 3, klart. 19 Drosler og 7 Lærker faldt (intet indsendt.).

(1911.)

Hesselø. Ø. 4, Regndis. 5 Vindrosler og 2 Stære faldt (intet indsendt.).

Stevns. Ø. N. Ø. 4, overtrukket. Af og til Regnbyger. 11 Lærker, 1 Sangdrossel, 7 Rødkælke og 1 Rørspurv faldt.

Hov. N. N. Ø. 4, skyet og klart. 1 Lærke faldt.

Alauda arvensis. Stevns 11, Hov 1.
Sturnus vulgaris. (Hesselø 2.).
Turdus musicus. Stevns 1.
Erithacus rubecula. Stevns 7.
Emberiza schoeniclus. Stevns 1.

30de Oktober.

Lodbjerg. Ø. S. Ø. 5, overtr. 1 Drossel og 2 Stære ved Ruderne efter Midnat.

1ste November.

Nordre Røn. V. S. V. 7, Regnbyger. 4 Drosler faldt; enkelte Smaafugle om Fyret.

2den November.

Vyl. V. N. V. 2, skyet. Nogle Fugle af og til ved Fyret om Natten; 1 Sjagger faldt.

Lyngvig. S. V. 2, skyet. Enkelte Drosler ved Fyret; 4 Sjaggere faldt.

Gedser Rev. V. 4, diset. Omkr. 10 Stære ved Fyret; 1 faldt paa Dækket (ikke indsendt.).

Sturnus vulgaris. (Gedser Rev 1.).
Turdus pilaris. Vyl 1, Lyngvig 1 (4 faldt.).

10de November.

Skagen. V. S. V. 3, klart. En Stær paa Ruderne.

11te November.

Nordre Røn. S. 4, Regn. Mange Fugle om Fyret.

Læsø Trindel. S. Ø. 3, Regn. Fugle om Fyret; 2 Vindrosler og 5 Solsorter faldt.

Turdus iliacus. Læsø Trindel 2.
Turdus merula. Læsø Trindel 5.

12te November.

Nordre Røn. S. Ø. 7. Enkelte Fugle om Fyret; ingen faldt.

(1911.)

Læsø Trindel. Ø. 9, Regn. Enkelte Fugle om Fyret; ingen faldt.

Østre Flak. S. Ø. 3, skyet. 1 Solsort faldt.

Anholt Knob. Ø. 3, overtrukket. Fugle om Fyret; 1 Sjagger faldt.

Turdus pilaris. Anholt Knob 1.
Turdus merula. Østre Flak 1.

13de November.

Lodbjerg. Ø. S. Ø. 6, overtrukket, Regn, Dis. 2 Viber i Nærheden af Taarnet om Aftenen. Efter Midnat S. Ø. 5. 2 Stære ved Ruderne.

Thunø. S. Ø. 7, Regn. 1 Solsort faldt.

Sejrø. S. S. V., overtrukket, Regn, af og til Taage. Nogle Drosler og Smaafugle omkring Fyret; 3 Vindrosler faldt.

Turdus merula. Thunø 1.

14de November.

Lyngvig. V. S. V. 2, skyet. Drosler og Lærker ved Fyret; 3 Lærker, 1 Sjagger og 1 Solsort faldt.

Lodbjerg. S. S. V. 4, overtrukket, Regn, Dis. 1 Stær ved Ruderne før Midnat.

Skagen. S. V. 4, Regn. Endel Drosler paa Ruderne; 1 Solsort og 3 Vindrosler faldt (ikke indsendte.).

Anholt Knob. S. 3, overtrukket. Fugle omkring Fyret.

Alauda arvensis. Lyngvig 1 (3 faldt.).
Turdus pilaris. Lyngvig 1.
Turdus merula. Lyngvig 1.

15de November.

Hanstholm. S. Ø. 2, Regn. Endel Sjaggere, Vindrosler og Solsorter omkring Fyret fra Kl. 7^{30} til Kl. 8^{30}.

Skagen. S. V. 3, overtrukket og Regn. Endel Drosler paa Ruderne; 1 Verling, 4 Vindrosler og 6 Sangdrosler faldt (ikke indsendte.).

Østre Flak. S. V. 3, overtrukket, Regn. Mange Fugle vare ved Fyret; 1 Sjagger og 1 Snespurv faldt.

Anholt Knob. S. V. 3, overtrukket, Regn. 1 Sjagger faldt.

Turdus pilaris. Østre Flak 1, Anholt Knob 1.
Emberiza nivalis. Østre Flak 1.

(1911.)

16de November.

Skagen. S. V. 4, diset. Enkelte Drosler og andre Fugle paa Ruderne.

17de November.

Skagen. V. S. V. 6, byget. Sangdrosler og flere Smaafugle paa Ruderne; 1 faldt (ikke indsendt.).

18de November.

Nordre Rønner. S. Ø. 2, overtrukket. Enkelte Smaafugle om Fyret.

19de November.

Graadyb. Ø. S. Ø., overtrukket. Enkelte Smaafugle om Fyret; 2 Lærker og 1 Snespurv faldt.

Nordre Rønner. N. Ø. 5, overtr. Endel Drosler og Sjaggere om Fyret.

Østre Flak. Ø. 2, overtrukket. 1 Fuglekonge og 1 Irisk faldt.

Sejrø. S. senere Ø. S. Ø., diset, Regn og Tykning. Enkelte Drosler ved Ruderne; 2 Vindrosler faldt (ikke indsendte.).

Gedser Rev. S. Ø. 3, diset. En enkelt Rødkælk ved Fyret.

Alauda arvensis. Graadyb 2.
Regulus cristatus. Østre Flak 1.
Cannabina linaria. Østre Flak 1.
Emberiza nivalis. Graadyb 1.

20de November.

Horns Rev. S. 3, overtr., Regn. Endel Smaafugle ved Fyret; nogle faldt i Vandet.

Lyngvig. N. Ø. 2, Regn. 1 Stormsvale, 4 Lærker og 7 Drosler faldt.

Lodbjerg. S. 2, overtrukket, Regn, Dis. En Drossel ved Ruderne før Midnat; 2 Rødkælke, 1 Stær og enkelte Drosler ved Ruderne efter Midnat; 2 Horsegøge og 1 Sjagger faldt.

Hanstholm. Ø. N. Ø. 4, Regn. Endel Sjaggere og Solsorter omkring Fyret fra Kl. 8 til Midnat.

Læsø Rende. Ø. 3, Regn. 1 Stær og 7 Sjaggere faldt.

Østre Flak. Ø. N. Ø. 4, overtrukket og Regn. En Mængde Fugle var hele Natten ved Fyret. 45 Kramsfugle, 1 Lærke og 5 Solsorter faldt; mange faldt i Søen.

(1911.)

Anholt Knob. N. N. Ø. 4, Regn. Mange Fugle ved Fyret; flere faldt udenbords; 1 Sjagger og 2 Solsorter faldt.

Anholt. Ø. S. Ø. 2, overtrukket, Regn. 1 Lærke, 1 Stær, 65 Vindrosler, 92 Sjaggere, 28 Solsorter, 1 Gulspurv og 2 Snespurve faldt.

Hesselø. N. N. V. 2, Regn, diset. 3 Skovsnepper, 5 Bekkasiner, 20 Vindrosler, 15 Sjaggere, 10 Solsorter og endel Lærker faldt (intet indsendt.).

Sejrø. Stille, Regn, diset. Store Fugleflokke omkring Fyret hele Natten; 8 Vindrosler faldt (ikke indsendte.).

Nakkehoved. S. S. V. 3, Taage og Regn. 3 Sjaggere faldt.

Procellaria pelagica. Lyngvig 1.
Gallinago scolopacina. Lodbjerg 2.
Scolopax rusticula. (Hesselø 3).
Alauda arvensis. Lyngvig 1, Anholt 1.
Sturnus vulgaris. Læsø Rende 1, Anholt 1.
Turdus iliacus. Lyngvig 1, Østre Flak 1, Anholt 5 (65 faldt.).
Turdus pilaris. Lyngvig 1, Lodbjerg 1, Læsø Rende 7, Østre Flak 1, Anholt Knob 1, Anholt 6 (92 faldt.), Nakkehoved 1 (3 faldt.).
Turdus merula. Østre Flak 1, Anholt Knob 1 (2 faldt.), Anholt 4 (28 faldt.), (Hesselø 10.).
Emberiza citrinella. Anholt 1.
Emberiza nivalis. Anholt 2.

21de November.

Østre Flak. N. N. Ø. 3, Regn og Sne. Flere Fugle ved Fyret; 2 Sjaggere, 4 Solsorter og 1 Stenpikker faldt.

Anholt Knob. N. Ø. 3, Regn. Mange Fugle ved Fyret; 1 Vindrossel faldt, flere faldt udenbords.

Stevns. N. V. 4, Regntykning. 1 Enkelt Bekkasin og 2 Vindrosler faldt.

Limnocryptes gallinula. Stevns 1.
Turdus iliacus. Anholt Knob 1, Stevns 2.
Turdus pilaris. Østre Flak 2.
Turdus merula. Østre Flak 4.
Saxicola oenanthe. Østre Flak 1.

22de November.

Lodbjerg. Stille, overtrukket, Sne og Dis. Nogle Drosler og 3 Solsorter ved Ruderne om Aftenen.

Østre Flak. N. N. Ø. 2, overtrukket. 1 Lærke og 2 Vindrosler faldt.

Anholt Knob. N. N. Ø. 3, overtrukket. Fugle omkring Fyret; 1 Solsort faldt.

Schulz's Grund. 3, Regn og Sne. 2 Lærker, 2 Vindrosler, 6 Sjaggere, 3 Solsorter og 1 Snespurv faldt.

Alauda arvensis. Østre Flak 1, Schultz's Grund 2.
Turdus iliacus. Østre Flak 2, Schultz's Grund 2.
Turdus pilaris. Schultz's Grund 6.
Turdus merula. Anholt Knob 1, Schult's Grund 3.
Emberiza nivalis. Schultz's Grund 1.

23de November.

Østre Flak. N. Ø. 3, overtrukket. 1 Lærke faldt.

Anholt Knob. N. 3, overtrukket. Fugle omkring Fyret.

Alauda arvensis. Østre Flak 1.

25de November.

Lodbjerg. Stille, overtrukket. 1 Stær ved Ruderne efter Midnat.

29de November.

Østre Flak. S. 2, Regn. 1 Lærke og 1 Sjagger faldt.

Drogden. N. V. 2, Taage og Dis. 1 Bomlærke faldt.

Alauda arvensis. Østre Flak 1.
Turdus pilaris. Østre Flak 1.
Emberiza miliaria. Drogden 1.

30te November.

Drogden. N. N. Ø. 2, Taage og Dis. 1 Bomlærke faldt.

Gedser Rev. N. V. 2, diset. 2 Lærker ved Fyret.

Emberiza miliaria. Drogden 1.

9de December.

Østre Flak. S. 1, overtrukket. Flere Fugle saas ved Fyret i Løbet af Natten; 1 Lærke og 2 Snespurve faldt.

Alauda arvensis 1.
Emberiza nivalis 2.

12te December.

Læsø Rende. S. S. V. 2, overtrukket. 1 Lærke faldt.

Alauda arvensis 1.

(1911.)

17de December.

Gedser. S. Tykning. 1 Vindrossel faldt; der faldt kun denne ene Fugl.
Turdus iliacus 1.

18de December.

Læsø Rende. S. 4. Regn. Enkelte Fugle ved Fyret; 1 Ryle faldt.
Tringa alpina 1.

19de December.

Anholt Knob. S. 5, overtrukket, Regn. 1 Lærke faldt.
Alauda arvensis. 1.

20de December.

Anholt Knob. 2, Taage. Enkelte Lærker ved Fyret; en lille Fugl fandtes senere paa Dækket død (ikke modtaget.).

24de December.

Læsø Rende. S. 4, overtrukket. 1 Ryle faldt (ikke indsendt.).

30te December.

Sejrø. N. Overtrukket. 1 Stor Stormsvale fangedes ved Ruderne i forkommen Tilstand.
Procellaria leucorrhoa 1.

Forskellige Iagttagelser fra Fyrene.

Graadyb Fyrskib. Februar: *28de* S. S. V. 5, Regntykning. Flere Lærker, flyvende i forskellige Retninger, iagttoges. Marts: *1ste* S. V. 4. Regn. Træk af Ænder mod N. Ø. *5te* V. N. V. 3. Regnbyger. Træk af Ænder mod N. Ø. *6te* N. V. 3. Klart. Træk af Viber. *10de* V. 3. Klart. Træk af Viber mod N. Ø. *14de* Ø. 3. Regnbyger. Træk af Ænder mod N. Ø. *28de* Ø. 3. Overtrukket. Træk af Viber mod Ø. — April: *14de* V. S. V. 3. Diset. Træk af Svaner mod N. — Oktober: *3dje* N. Ø. Klart. En Flok Svaner fløj mod S. *4de* S. Klart. En Flok Vildgæs fløj mod S. *6te* Ø. Klart. Flere Træk af Smaafugle mod S. *9de* N. Ø. Klart.

(1911.)

Træk af Smaafugle mod Ø.; flere Træk af Ænder mod S. *11te* N. V. Klart. Træk af Vildgæs mod S.; Krager omkring Skibet. *15de* Ø. Klart. Træk af Vildgæs mod S.; Smaafugle og Krager omkring Skibet. *16de* Ø. S. Ø. Klart. Træk af Smaafugle mod S.; Træk af Ederfugle og Svaner mod N. V. *19de* Ø. S. Ø. Klart. Træk af Smaafugle mod S. *27de* V. Skyet. 7 Graagæs trak mod S. *28de* N. Ø. Skyet. En Flok Krager fløj mod Ø. — December: *7de* S. S. Ø. Graat. En Gærdesmutte og enkelte Smaafugle fløj om Skibet. *9de* V. S. V. Skyet. En Flok Ænder fløj mod S. — J. S. Ibsen.

Vyl Fyrskib. Januar: *1ste* N. V. 5. Graat. En Del Søpapegøjer saas idag svømme, dykke og flyve rundt om Skibet. Imellem dem saas en meget lille, paa Størrelse med en Stær [Mergulus alle?]. Maagerne, hvoraf en Mængde i denne Tid opholder sig ved Skibet, graadigt slugende alt Affald, gjorde ivrigt Jagt paa den, men den dykkede under hver Gang, de kom den nær. Flere Suler saas. *19de* V. N. V. 3. Graat. Flere Smaafugle, vistnok Lærker, saas i Dagningen flyvende mod S. Ø.

Februar: *7de* N. N. V. 4. Regnbyger. Enkelte Lærker saas om Morgenen. *13de* Ø. S. Ø. 2. Taage. Flere Smaaflokke af Lærker saas idag. *18de* S. V. 4. Graat. Viben hørtes inat. *27de.* En Kramsfugl saas paa Dækket.

Marts: *14de* Ø. N. Ø. 2. Regn. En Snespurv saas paa Dækket idag. *16de.* En Bogfinke og 2 Engpibere opholdt sig paa Dækket. *22de* Ø. 3. Skyet. En Gærdesmutte opholdt sig paa Dækket i Eftermiddag. *28de* Ø. 2. Graat. En Ugle opholdt sig i Rigningen om Eftermiddagen. *29de* Ø. N. Ø. 2. Graat. En Stær opholdt sig paa Dækket. *31te* N. Ø. 2. Klart. Flere Smaafugle opholdt sig idag paa Dækket, derimellem Fuglekonger og Gærdesmutter.

April: *2den* Stille, Taage. Endel Stære, Lærker og Drosler saas ved Skibet.

Maj: *2den* S. 2. Taage og Dis. Endel Drosler og Stære flyve om Skibet. *10de* Ø. N. Ø. 2. Letskyet. En Mængde forskellige smaa Sangfugle flyve rundt paa Dækket, jagende efter Fluer og andre

Insekter, der i det smukke Vejr ere komne ombord i stort Antal. I Skumringen saas en lille Ugle komme flyvende fra Ø. Terner saas idag. *11te* Ø. 2. Halvklart. Endel smaa Sangfugle opholde sig stadig ombord og jage efter Fluer. En Høg saas i Middags at kredse om Skibet. I de sidste Par Dage er en Fugl paa Størrelse med en stor Due hyppigt set kredsende om Skibet; den er lys med sort Hoved, Vinger og Hale; Halen løber ud til to lange Spidser. Af Søfolk kaldes den „Baadsmanden med Merlespigerne“ [Lestris sp]. En Skovdue hvilede idag paa Klyverbommen. *13de.* Stille, klart. Endel Smaafugle stadig ombord. *16de* V. 2. Taage. En Spurvehøg kredsede om Skibet imorges. *17de* N. 2. Skyet. Et Par Stære og nogle Smaafugle ved Skibet. En Spurvehøg kredsede om Skibet og satte sig hyppigt til Hvile et Øjeblik. *20de* N. N. Ø. 2. Skyet. Nogle Suler saas idag, jagende efter Maagerne. *25de.* Stille, graat. En Flok Svaler fløj rundt om Skibet idag. *26de* Ø. S. Ø. 2. Skyet. Nogle smaa Sangfugle saas idag jagende efter Fluer paa Dækket. Flere Svaler saas ved Solnedgang. *29de* N. Ø. 2. Klart. To smaa Sangfugle opholdt sig paa Dækket idag, jagende efter Fluer.

Juni: *20de.* Stille, Regn. En Sjagger saas ved Skibet idag. *24de* N. V. 2. Letskyet. En Korsnæb opholdt sig en Tid paa Skibet. *26de* Ø. 2. Klart. En Høg sad ved Solnedgang nogen Tid i Rigningen.

August: *11te.* Stille, klart. To Graa Fluesnappere have igaar og idag opholdt sig paa Skibet og været travlt beskæftiget med at fange Fluer.

September: *16de* Ø. 2. Klart. I Formiddags opholdt en Fuglekonge sig omkring paa Skibet.

Oktober: *7de* Ø. S. Ø. 3. Skyet. En Høg kredsede om Skibet ved Solnedgang; en Ryle og en stor Ugle saas flyve om Skibet. *14de* N. N. Ø. 2. Tætskyet. En Høg, Krager og flere Smaafugle saas idag. *20de* S. 2. Skyet. Nogle Bogfinker og Stære opholdt sig i Eftermiddag omkring paa Dækket. *21de.* Imorges var atter et Par Bogfinker paa Dækket. *24de* V. 5. Regnbyger. I Eftermiddag var 2 gule Vipstjerter paa Dækket; de fløj bort mod S. V. — J. S. Jensen, A. H. Schmidt.

(1911.)

Horns Rev Fyrskib. Februar: *13de* Skyet. 2 Stære opholdt sig paa Dækket om Dagen. — Maj: *11te.* En lille Fugl opholdt sig paa Dækket hele Dagen, blev Natten over og fandtes død paa Dækket om Morgenen (ikke indsendt.); en Høg kom og satte sig i Rigningen om Aftenen ved Fyrets Hejsning. *12te.* Flere forskellige Smaafugle kom om Morgenen flyvende til Skibet og blev hele Dagen; de fleste af dem fandtes døde om Natten paa Dækket. — Oktober: *4de.* En Høg kom om Aftenen og satte sig paa Mesanbommen, fløj kort efter bort. *6te.* En Stær kom om Formiddagen, satte sig i Rigningen, fløj kort efter bort. *13de.* En Flok Stære (omtr. 10 Stkr.) kredsede flere Gange om Skibet ved Fyrets Hejsning og fløj derefter bort. *14de.* Enkelte Smaafugle sad om Morgenen ved Fyrets Slukning i Rigningen, men fløj kort efter bort. — November: *20de.* En Ravn opholdt sig i 4 Dage paa Skibet; den 5te Dag om Morgenen var den borte og antoges det, at den var falden i Vandet om Natten. — H. Sonnichsen, C. E. Søjborg.

Bovbjerg. Januar: *12te.* Aarlig plejer Masser af Fugle at vise sig ved Fyret, men iaar er ingen set siden sidst i November. — Februar: *26de.* Ingen Fugle set siden 12te Januar. — Maj: *8de* S. Ø. 2. Dis. Flere store Flokke Graagæs trak mod N.; der var i hundredevis i hver Flok. — C. Rude.

Thyborøn. Februar: *2den* N. V. Skyet. En Rødben paa Fjordstranden. — April: *14de* V. Diset. En stor Flok Krager trak mod N. Ø., efter at have opholdt sig paa Fjordstranden en Tid. *18de* S. Ø. Skyet. En Mængde Krager trak mod N. — Maj: *6te* N. V. Klart. En Flok Ænder trak ind over Kanalen. *9de* N. Ø. Skyet. Endel Krager trak mod N. Ø. — September: *6te* V. N. V. Skyet. Vildgæs trække fra N. langs Kysten. *8de* S. V. Diset. Vildgæs trække fra N. langs Kysten. *9de* N. V. Skyet. 6 Flokke Vildgæs trak ind i Fjorden. *14de* N. V. Byger. Store Flokke Vildgæs trak fra N. *15de* N. V. Store Flokke Vildgæs kom atter idag trækkende fra N. — Oktober: *1ste* N. N. Ø. Skyet. 5 Krager trak mod S. *3dje* N. N. Ø. Byger. Store Flokke Vildgæs trak

mod S. *4de* S. Byger. 3 Graagæs trak mod S. *6te* Ø. N. Ø. Diset. En stor Flok Graagæs trak mod S. *19de* S. Ø. Diset. En stor Flok Krager trak mod S. V. — J. Nielsen.

Lodbjerg. Februar: *2den.* Nogle Stillidser i Fyrets Plantage om Dagen. *24de.* Drosler og Solsorter i Haven om Dagen. — Marts; *11te.* Rødkælken set om Dagen. — April: *24de.* Lys Fluesnapper set om Dagen. — Maj: *10de.* Svalen set om Dagen. *14de.* Gøgen hørt om Dagen. — Oktober: *22de* S. Ø. 4. Overtrukket, Regn, Dis. En Drossel set i Haven om Dagen. — P. S. Pedersen.

Højen. Intet Fuglefald. — A. T. Friis.

Skagen. Maj: *12te* Ø. 3. Skyet. Hørtes Gøgen første Gang. — Oktober: *16de* S. 2. Klart. 3 Gæs fløj mod S. — November: *9de* S. V. 4. Skyet. En stor Flok Gæs fløj mod S. V. — G. H. E. Wielandt.

Skagens Rev Fyrskib. Januar har der været de sædvanlige Maager og Alke, men ellers intet særligt Træk af Fugle. — Februar: *2den* V. 4. Skyet. 2 Lærker vare ved Skibet. *10de.* Laber, løbende Vind, skyet. 1 Lærke var her ved Skibet om Dagen. *24de.* Vind 4. Bygevejr. 2 Lærker vare ved Skibet. *25de.* Vind 4. Skyet og Byger. Flere mindre Flokke Lærker fløj forbi Skibet om Dagen. *26de* S. 3. Skyet. Atter i Dag fløj flere mindre Flokke Lærker forbi Skibet. — Marts: *1ste* N. Ø. 2. Klart. 2 Krager fløj mod Øst; endel Lærker var her i Løbet af Dagen. Fra *5te* til *10de* saas enkelte Krager og Lærker ved Skibet. *12te* S. 4. Byget. En enkelt Vibe fløj mod V. *13de* S. 2. Overtrukket, Byger. I Løbet af Dagen vare enkelte Stære ved Skibet. *20de.* Stille, klart. Flere Flokke Lærker og Krager trak forbi Skibet i Løbet af Dagen. *24de* N. Ø. 3. Skyet. En Mængde Krager fløj i Ø.; enkelte Lærker og Stære vare ved Skibet. *24de* til *31te* fløj daglig Lærker, Krager og enkelte Stære forbi Skibet. — April: *16de* og *17de* V. 9. Klart. Flere Flokke Ænder fløj mod Ø. — Maj: *2den* S. V. 2. Overtrukket. Flere Flokke af Ænder og Gæs. *13de* S. Ø. 2. Overtrukket. Flere Smaafugle ved Skibet. *31te* N. N. Ø. 2.

(1911.)
Klart. I Løbet af Dagen fløj en Masse Svaler i østlig Retning. — Oktober: Iagttoges Flokke af Ænder, ellers kun de sædvanlige Maager. — November: *11te* S. 2. Overtrukket. Enkelte Flokke af Krager fløj i vestlig Retning. *14de* S. S. V. 3. Overtrukket. Flere Flokke af Ederfugle og Ænder fløj i alle Retninger. — December: Maager og Alke saas, ellers iagttoges ingen andre Fugle. — T. A. R. Due.

Nordre Rønner. Januar: Intet Fuglefald. *17de.* Stæren set. *26de.* 4 Svaner fløj i N. V. — Februar: *1ste.* 2 Svaner fløj i S. V. *6te.* Præstekraven set første Gang. *16de.* 2 Svaner fløj i N. Ø.; de første Gravænder saas. *23de* kom flere Gravænder, som toge Ophold her for Sommeren. — Marts: Intet Fuglefald. Af andre Fuglearter har her været ligesom de foregaaende Aar og noget forøget i Tal. — L. F. Madsen.

Læsø Trindel Fyrskib. Januar: *27de* N. V. 2. Overtrukket. 6 Svaner og omkr. 20 Gæs trak N. *29de* N. Ø. 2. Klart. 18 Svaner trak N. — Februar: *12te* Ø. 2. Skyet. En Stær opholdt sig paa Dækket. *20de* V. 2. Skyet. 14 Svaner trak N. Ø. *25de* S. 2. Skyet. En Flok Viber fløj forbi. — Marts: *8de* S. Ø. 2. Skyet. Flere Flokke Krager mod N. Ø. *11te* S. V. 6. Regn. En Flok Viber mod S. V. — April: *1ste* Ø. S. Ø. 2. Skyet. Flere Flokke Krager fløj mod N. Ø. *16de* V. 6. Regnbyger. En Flok Krager fløj mod N. Ø. *17de* N. V. 5. Skyet. Atter idag fløj en Flok Krager mod N. Ø. — Juli: *24de* V. 3. Skyet. 12 Viber fløj mod S. Ø. *30te* S. Ø. 3. Klart. En Due opholdt sig ombord nogle Timer om Formiddagen; en Falkehøg kredsede nogle Gange om Skibet og fløj da mod S. V. — September: *2den* V. S. V. 3. Skyet. Nogle Lærker og Vipstjerter mod S. V. *23de* Stille og Smaabyger. 2 Svaler ombord midt paa Dagen. — Oktober: *8de* N. 3. Skyet. En Bogfinke ombord midt paa Dagen. *12te* V. N. V. 3. Skyet. Flere Flokke Krager fløj mod S. V. *14de* Ø. 2. Skyet. En Flok Graaspurve ombord; mange Krager fløj mod S. V. — November: *1ste* V. 7. Regnbyger. Mange Flokke Ederfugle i alle Retninger. *4de* V. S. V. 7. Tre Suler fløj mod Vest. *25de* Ø. N. Ø.

4. Skyet. Flere Flokke Svaner fløj mod V. — December: *1ste* S. Ø. 3. Overtrukket. En Flok Svaner paa 15 Stkr. fløj mod V. — F. Winther.

Læsø Rende Fyrskib. Februar: *25de.* En Maage [Larus tridactylus.], forfulgt af andre søgte Tilflugt ved Skibet og fangedes; Bugen var oprevet. *26de.* 10 Svaner fløj fra V. mod Ø.; 6 Viber fløj fra V. mod Ø. — Oktober: *7de* S. 3. Skyet. Flere Flokke Krager fløj mod V. *8de* N. Ø. 3. Regn. Flere Flokke Krager fløj mod V.; en Bogfinke opholdt sig paa Skibet. — P. C. Grumsen.

Egense. Januar: *13de* S. S. V. Skyet. I Farvandet iagttoges forskellige Flokke Ænder og Ederfugle. — Februar: *5te* N. V. 2. Klart. Flere Stære saas i Stationens Have og Lærker hørtes. *12te* Ø. Skyet. Blaakrager saas paa Landgrunden. *19de* Vind 1. Skyet. Stæren saas i store Flokke og 2 Viber saas. — Marts: *9de* S. Ø. 1. To store, sortvingede Maager saas paa Grunden. — April: *9de* N. Ø. Skyet. Store Flokke af Gæs paa Kanten af Landgrunden. *10de* Vind 6. Skyet. Gæs og Maager i Flok paa Landgrunden. *22de* S. V. Overtrukket. Store Flokke Gæs opholdt sig paa Landgrunden. — Maj: *4de* S. V. Den første Svale saas paa Stationen. *7de.* Stille, klart. 4 Svaler saas; de første Maageæg fandtes paa Holmen; Storken saas i Hals. — Juni: *30te* S. V. 2. Skyet. En Strandsneppe saas paa Strandbredden. — Oktober: *3dje.* Stille. Stæren trak mod S. *5te.* Stille. En Flok Svaner trak mod S. — A. C. G. Grove-Stephensen.

Anholt Knob Fyrskib. Februar: *20de* V. 2. Skyet. Enkelte Lærker hørtes synge. *24de* V. S. V. 5. Regn. En Vibe og 2 Lærker fløj mod V. — Marts: *7de.* Stille, skyet. Store Flokke Krager fløj mod Ø. *12te* S. S. V. 3. Taage. Enkelte Smaafugle omkring Skibet. *31te* N. 2. Skyet. Mange Flokke Krager fløj mod Ø.; flere Smaafugle opholdt sig paa Skibet. — April: *18de* S. 3. Regn. Flere Flokke Krager fløj mod Ø. *19de* S. Ø. 2. Diset. Flere Smaafugle paa Dækket hele Dagen. — Maj: *1ste* S. V. 3. Skyet. Flere Smaafugle opholdt sig paa Skibet. *16de* S. Ø. 3. Overtrukket. En Flok Graagæs fløj mod V. — Juni: *9de* N. 5.

(1911.)

Klart. 2 Stære opholdt sig en kort Tid paa Skibet og fløj da mod S. S. V. — September: *1ste* V. 6. Overtr. En Svale opholdt sig nogle Timer paa Skibet, fløj senere mod V. *7de* V. N. V. 6. Skyet. En Flok Ænder fløj mod S. V. *21de.* S. Ø. 6. Overtrukkket. En Flok Ænder fløj mod S. V. — Oktober: *11te* N. V. 5. Skyet. Flere Skovspurve opholdt sig paa Dækket hele Dagen; en fandtes død (indsendt.). *15de* Ø. S. Ø. 6. Skyet. Flere Flokke Krager fløj mod V. *16de* S. Ø. 3. Skyet. Atter idag fløj store Flokke Krager mod V. *28de* N. N. Ø. 4. Skyet. Flere Flokke Krager fløj mod S. V. — November: *4de* V. 8. Skyet. En Flok Ænder fløj fra Ø. mod S. V. — Th. Andresen. Toftgaard Nielsen.

Spodsbjerg. Intet Fuglefald. — P. Christensen.

Fornæs. Februar: *2den* N. V. 3. Overtr. Den første Stær saas. *7de* N. N. Ø. 5. Skyet. 2 Svaner fløj lavt over Havet fra S. til N. — April: *29de* V. 3. Regn. Om Dagen saas mange Rødkælke i Fyrets Have. — Maj: *14de* S. Ø. 2. Klart. 3 Strandskader fløj langs Stranden fra N. til S. Ingen Taage eller usigtbart Vejr i dette Foraar er vel Aarsagen til, at ikke flere Fugle have været omkring Fyret. — Juli: *27de* S. 3. Skyet. Omkr. 50 Knortegæs passerede Fyret fra S. til N. *31te* Ø. S. Ø. 2. 13 Strandskader fløj lige over Fyrbygningen fra N. til S. — August: *24de* V. 3. Skyet. 15 Regnspover passerede Fyret fra S. til N. — September: *16de* N. 2. Klart. 7 Skarve fløj over Fyret fra N. til S. Toplærker, som have været set her ved Fyret hele Aaret rundt i flere Aar, ere ikke iagttagne her i 1911. Intet Fugletræk har været her i Efteraaret. — A. Kruse.

Hjelm. Januar: *1ste.* Set en Stær. Februar: *20de.* Set en Stork. *21de.* Set Viben. — A. Jensen.

Æbeltoft. Intet Fuglefald. — H. P. Mønsted.

Sletterhage. Intet. — V. Larsen.

Sejrø. Oktober: *7de.* Ederfuglene begynde nu at indfinde sig; de opholde sig i Smaaflokke paa Revet udfor Fyret. *15de* Ø. S. Ø. Om Morgenen saas enkelte store Flokke Ederfugle og Dykender paa Træk. — November: *13de* S. S. V. Store Flokke af

Dykænder og Ederfugle opholde sig paa Søen udfor Fyret. *19de* S. senere Ø. S. Ø. Smaaflokke af Havlitter saas og hørtes paa Søen i Fyrets Nærhed. — December: *28de.* 4 Svaner saas ude paa Revet N. V. for Fyret. — N. J. Z. Nielsen.

Lappegrundens Fyrskib. Februar: *17de* N. V. 8. To Vildænder fløj mod V. *20de* Ø. 3. En Flok Lærker fløj mod S. Ø. — Marts: *1ste* V. S. V. 2. Skyet. 8 Svaner fløj mod N. *8de.* En Flok Ederfugle fløj mod Ø. *31te.* Flere Flokke Ederfugle trak i forskellige Retninger. — April: *8de* N. V. 2. Klart. Flere Flokke Ederfugle trak mod S. *18de* S. S. Ø. 2. En Flok Vildgæs fløj mod S. — September: *19de* S. Regnbyger. En Flok Vildgæs fløj mod N. — Oktober: *11te* N. V. En Flok Vildgæs fløj mod V. *12te* N. V. Flere Flokke Ederfugle og Vildænder fløj i forskelllige Retninger. *14de* S. Ø. Flokke af Krager fløj mod S. V. *20de* S. V. En Flok Vildgæs fløj mod V. *28de* N. N. Ø. En Flok Ederfugle fløj mod V. — November: *1ste* V. N. V. En Flok Ederfugle fløj mod S. *8de* S. S. V. En Flok Vildgæs fløj mod V. — December: *17de* S. V. En Flok Vildænder fløj mod S. Ø. *25de* S. V. En Flok Vildænder fløj mod S. — J. C. Jensen, A. Albertsen.

Kronborg. Intet Fuglefald. — H. B. J. Reinwald.

Middelgrunden. Intet. — A. G. Saxtorph.

Trekroner. Intet Fuglefald. — H. E. Andresen.

Nordre Røse. Her ved Fyret er i Aarets Løb ikke indtruffet noget Fuglefald; de Fugle, som i Reglen trække her, ere Ederfugle og af og til en Flok Gæs, som om Aftenen trækker over mod Saltholmen. — J. F. Hansen.

Drogden Fyrskib. September: *25de* V. En Rødkælk ved Fyret hele Dagen. — Oktober: *30te* S. Ø. Skyet. En Svane fløj fra V. mod N. Ø. Kl. 8 Form. — November: *19de* Ø. S. Ø. 5 Svaner i Flok fra S. V. mod N. Ø. *30te.* Lærker i Flok ved Skibet Kl. 9 Form. — December: *1ste* Ø. N. Ø. 12 Svaner fløj fra N. Ø. mod S. V. Kl. 10 Form. *8de* S. S. Ø. Dis. 5 Lærker kredsede om Skibet Kl. 9 Form. — N. J. Kromann.

Refsnæs. Hele Vinteren store Flokke af Ederfugle, Havlitter, Sortænder og enkelte Torskeænder [efter indsendt Prøve Fløjlsænder (*Oedemia fusca*)] paa Revet. — Marts: *30te* begyndte de første Ederfugle at trække mod N. — April: *26de* saas Storken første Gang. — Maj: *2den* saas Svalen første Gang; 3 Par Gravænder ankom til Rugeplads i Fyrets Nærhed. *9de* hørtes Gøgen første Gang. — I Oktober og November saas flere Nøddekriger i Fyrets Nærhed, undertiden Flokke paa omtr. 20 Stkr. Ederfugle. Havlitter og Fløjlsænder have hele Efteraaret opholdt sig paa Revet. — C. F. V. Jensen.

Romsø. Maagerne begyndte d. 15de Juli at trække væk fra Øen med Yngelen. — H. Würtz.

Halskov. Intet Fuglefald. — C. P. Henningsen.

Sprogø. Februar: *3dje.* 4 Svaner fløj fra S. til N. *4de* saas Stæren første Gang. — Marts: *17de.* Stort Kragetræk fra Fyn til Sjælland. *23de* ankom de første Maager, en Snes Par, til Rugepladsen. — April: *16de* saas de første Maagerededannelser. *18de* kvækkede Strandtudse og Grønbroget Tudse første Gang iaar. *19de* saas den første Svale. *24de* saas de første Hættemaageæg. *27de* saas de første Strandmaageæg. — Maj: *9de* saas en stor Flok (et Par Tusind) Ederfugle trække mod N. i Bæltet; der har været usædvanlig mange Ederfugle tilstede i Løbet af Forsommeren. — Juni: *16de* saas de første Strandmaageunger. — August: *9de* havde Maagerne forladt Øen. *26de* kom flere store Flokke Stære til Øen, efter at de havde været borte nogen Tid. — Oktober: *8de.* Kragetræk fra Sjælland til Fyn. *9de* saas den første store Flok nyankomne Ederfugle paa Revene; Ederfuglene synes at være talrigere og at være tidligere i Aar, end de pleje; sidst paa Aaret, og efter at være jagede endel, var dog en stor Del af dem atter trukket bort. Fugletrækket forbi Sprogø har i 1911 været yderst sparsomt. — A. V. Hansen.

Slipshavn. Intet Fuglefald. — E. Jørgensen.

Helholm. Januar: *22de* Gravgaasen set. — Februar: *19de.* Viben og Strandskaden sete. I Aaret 1911 intet Fuglefald.

(1911.)
Af Fugle, som ruge her, kan nævnes Strandskaden, Strandmaagen, den Sorthovede Maage, Gravanden, Graaanden og den Spidsnæbede And. — P. Larsen.

Omø. Juli: *24de.* Om Natten faldt en Brevdue ved Fyret; den var mærket med en Ring om højre Ben med Indskrift D. 11 —110. Stille og skyet. — September: *10de* store Flokke Viber fløj om Eftermiddagen over Øen mod S. — Oktober: *27de* S. V. Stormende, skyet og diset. En Mængde (omtr. 200 Stkr.) Ederfugle opholde sig ved Fyret; de kom i Løbet af Natten. — November: *14de,* diset. Kl. 8 Aften stod jeg ude paa Omgangen i Anledning af, at Orlogsskibe affyrede flere Kanonskud, hvorved en større Flok Ederfugle blev opskræmt; i deres Forskrækkelse fløj de lige mod Fyret, som de først opdagede i sidste Øjeblik. Jeg saa dem i Flugten rejse sig lige paa Halen med Fødderne udstrakt som for at værge for sig og Vingerne udspilede. Fuglene tumlede ned paa begge Sider af Taarnet; jeg hørte dem straks efter kravle i Vandet. En Fugl klarede sig ikke; Farten, den havde paa, var for stærk, saaledes at den kom ind mellem Gelænderet og Taarnet og forslog sig endel; jeg var straks efter nede og undersøge Stranden, men de andre vare da komne i Vandet. — P. F. Köhler.

Vejrø. Intet Fuglefald i sidste Halvaar. — C. A. Hansen.

Taars. Intet Fuglefald. — W. Pedersen.

Æbelø. I Efteraaret har der ikke været en eneste Fugl paa Ruderne. — E. Schønfeldt.

Strib. Intet Fuglefald. — Februar: *17de* Stæren set. — Marts: *31te.* Stille; Mange Flokke Graagæs fløj mod N. — August: *10de.* Stille og klart. Mange og store Flokke Himmelhunde trak mod S. — September: *20de* S. S. V. 2. Overtr. Mange og store Flokke Graagæs trak mod S. — Enkelte forskellige Ænder have opholdt sig i Bæltet hele Aaret. — A. H. Andersen.

Baagø. Intet Fuglefald eller Fugletræk iagttaget. — N. Hansen.

Assens. Intet Fugletræk eller Fuglefald iagttaget i Aarets Løb. — N. Lund.

(1911.)

Hammeren. Oktober: Daglig ses Vildgæs trække mod V. i smaa Flokke. *26de* V. S. V. 8. Diset. Omkr. 20 Svaner fløj mod V. — A. M. Dam.

Dueodde Sydfyr. April: *9de* N. V. 2. En Flok Svaner paa omtrent 50 Stykker saas paa Søen S. V. for Fyret i en Afstand af c. 2000 Alen fra Kysten. — Oktober: *13de* N. V. 1. En Flok Graagæs trak mod S. V. ud over Søen Kl. 4 Eftm. *14de* Ø. 3. Klart. En Flok Graagæs paa 23 Stykker trak mod Ø. om Eftermiddagen Kl. 5. *16de* Ø. 3. Klart. 8 Graagæs trak mod S. V. — November: *16de* S. V. 3. Kl. 11 Form. saas 21 hvide Svaner i Flok trækkende langs Kysten mod Vest; Kl. 11^{45} saas 19 Svaner i Flok atter trækkende langs Kysten mod Vest. — Ud over ovenstaaende har intet været iagttaget. Intet Fuglefald af nogen Slags har fundet Sted i 1911. — H. S. L. Madsen.

Møen. Ingen Fugle ere faldne i Aaret 1911, dog kun at regne fra 5te April, da jeg tiltraadte Tjenesten her. — H. P. Jensen.

Harbølle. Intet Fuglefald. — A. J. Olsen.

Gedser. Oktober: *16de* Kl. 10^{45} trak en Flok Vildgæs fra N. V. og fortsatte i S. S. Ø. ud over Søen. — Fuglefaldet i dette Efteraar har her ved Fyret været meget ringe, hvilket antages at skyldes den Omstændighed, at vi kun have haft ringe Tykning i Træktiden. — Chr. Lindgaard.

Gedser Rev. Januar: *20de* V. 3. 6 Svaner fløj fra N. V. mod S. Ø. — Februar: *7de* V. S. V. 3. Tre Svaner fløj fra N. V. mod S. Ø. *11te* S. Ø. 2. 17 Svaner fløj fra S. Ø. mod N. V. — Marts: *8de* V. 2. Omkring 50 Graagæs fløj fra N. V. mod S. Ø. *31te* V. S. V. 2. Diset. 30 Graagæs trak fra N. V. mod S. Ø. — August: *28de* S. V. 2. Tre Fluesnappere opholdt sig ved Skibet Dagen igennem. *29de* V. 3. Skyet. 100 Storke fløj mod S. S. Ø. Kl. 4 Efterm. — J. Jensen.

Hyllekrog. Februar: *25de* Stille, klart. Flokke af Lærker kom fra S. — J. N. B. Höeg.

(1911.)

Meddelelser om mindre almindelige danske Fugle.

Colymbus arcticus.

En Sortstrubet Lom, Han, blev skudt ved Oddesund i Limfjorden 1ste Januar 1912 og indsendt som Gave til Museet af Fisker Peter Outzen.

Procellaria pelagica.

To Stormsvaler fandtes ifølge Meddelelse fra Lærer Chr. Christiansen 6te November 1911 døde paa Jelling Mark og Toftby Mark, Gadbjerg Sogn (c. 15 Kilm. N. V. for Vejle), sandsynligvis forslaaede og dræbte i den foregaaende Stormnat; de fandtes en Afstand af c. 250 m. fra hinanden.

Phalaropus hyperboreus.

En Odinshane, ung Hun, blev skudt paa Taarnby Fælled, Amager, 31te August 1912; Skindet erhvervedes af Zoologisk Museum.

Alca torda.

En Alk, ung Hun, i Sommerdragt men hvidfødt med alle de ellers rensorte Fjer hvidbrune, skudt 10de Maj 1911 i Lille Belt, modtog Museet fra Lottericollecteur J. Petersen i Assens.

Lestris longicauda.

En Lille Kjove, ung Han, blev skudt i Kalvebodstrand 12te September 1911; Skindet, der var usædvanlig lyst farvet, erhvervedes af Museet.

Sula alba.

En udfarvet Sule fandtes mellem Jul og Nyaar 1910 døende paa Vandet nær Middelgrunden, meddeler Fyrmester H. Würtz.

Aquila nævia.

En Skrigørn, gammel Hun, blev, efter Meddelelse af Conservator H. P. Hansen i Herning, skudt 7de Juli 1912 i Højsvig, Sønder Felding ved Troldhede, hvor den havde opholdt sig omtrent

14 Dage i et Egekrat med Eng ved den ene Side. Skindet og Skelettet erhvervedes af Zoologisk Museum.

Circus cineraceus.

En Enghøg, udvokset Han, blev skudt ved Sevel, Vinderup, N. Ø. for Holstebro 1ste Aug. 1912. I Maven var Rester af 1 Mus og 2 Lærker. Skindet modtog Museet fra Conservator H. P. Hansen, Herning.

Nucifraga caryocatactes v. macrorhynchus.

Nøddekriger viste sig i Efteraaret 1911 i betydelig Mængde, som det synes over alle Landets Dele. Til Museet indkom følgende Individer:

Et Expl. skudt ved Refsnæs Fyr 24de September 1911 af C. F. V. Jensen; i Oktober og November saa han ligeledes flere Nøddekriger i Fyrets Nærhed, undertiden i Flokke paa omtr. 20 Stkr.

En ung Hun blev skudt 7de Oktober 1911 i Farum af frh. Møller J. P. Jørgensen.

En Han blev skudt 14de Oktober 1911 i Boserup Skov ved Roskilde af Stud. med. Ed. Collin.

To gamle Hunner bleve skudte i Rude Skov ved Holte 27de Oktober 1911. (R. Hørring).

To Expl. (deraf den ene en gammel Hun) bleve skudte i Boserup Skov 16de November 1911 af Stud. med. Collin; han havde set endel af dem.

En Han blev skudt 24de November i Rude Skov; samme Dag saas en Nøddekrige flyve højt over Skoven. (R. Hørring).

En ung Hun, skudt 4de Januar 1912 i Holte, hvor den overraskedes gaaende mellem Hønsene i en Hønsegaard, modtoges fra Conservator J. E. C. Scheel. Hele Efteraaret havde Nøddekriger stadig været at se i Geel Skov ved Holte.

Hirundo rustica.

Fra Lærer Tejlbjerg i Nivaa modtog Museet en fuldkommen hvid ung Landsvale, født paa Nivaagaard og set der til sin Død

(1911.)
1ste Oktober 1911. — 17de September 1912 saas en ligeledes renhvid Landsvale flyve i Tømmerup Overdrev paa Amager (R. Hørring).

Parus cristatus.

Distriktslæge A. Bertelsen iagttog flere Gange Topmejser ved Vejlefjord Sanatorium i Vinteren 1911—12. Reservelæge K. Schäffer har venligst meddelt følgende Enkeltheder om dens Ynglen sammesteds; han iagttog Fuglen første Gang nær Yglestedet i Slutningen af Marts eller Begyndelsen af April 1912, da et enkelt Individ færdedes i Granerne; derefter saas jævnligt en eller to i Følge; 12te Maj og senere saa han et Individ flyve ud af et Hul i et gammelt Piletræ; 1ste Juni og senere saas sammesteds 2 Topmejser med Foder i Næbet hoppe ud og ind af samme Hul, hvorfra Ungerne hørtes at pibe; efter at Ungerne vare fløjne af Reden, undersøgte han 11te Juni denne nøjere; nævnte gamle Pil, der sammen med andre danner et Gærde om en Strandeng, er kun skilt fra Strandkanten ved en smal Gangsti; Redehullet var c. 150 cm. fra Jorden; Reden sad c. 15 cm. inde og var bygget af Mos og hovedsageligt udforet med Faareuld; i Reden fandtes et ikke udruget Æg. Nær Redestedet fandtes store Granplantager.

Praticola rubicola.

Fra Conservator Scheel har Museet erhvervet Skindet af en Sortstrubet Bynkefugl, Han, skudt i Omegnen af Ribe i August 1903.

Luscinia vera.

En Sydlig Nattergal, udvokset Hun, faldt 25de Maj 1911 ved Kjels Nor Fyr; sml. S. 175. Skindet i Zoologisk Museum.

Fra Færøerne.

Tveraa. Intet Fuglefald. — E. B. Jacobsen.

Sumbø. Oktober: *16de.* Stille, Taage. Flokke paa flere Hundrede Smaafugle fløj omkring Fyret. *24de* Ø. 4. Overtrukket.

(1911.)

En Svenske (*Ligurinus chloris*) faldt og nedsendtes til Museet. *30te* S. Ø. 4. Skyet. Flere Flokke Graagæs i Nærheden af Fyret. *31te* S. Ø. 3. Regn. Smaafugle paa Ruderne; ingen faldt. — November: *1ste* N. 1. Skyet. En Vandrikse faldt (ikke indsendt.). — J. Jacobsen.

Tofte. Intet Fuglefald. — Simon Thorkildshøj.

Kalsø. Intet Fuglefald. — Joen Clementsen.

25. 9. 1912.

Additions and Corrections to the paper: On a new Gymnoblastic Hydroid (*Ichthyocodium sarcotretis*) epizoic on a new Parasitic Copepod (*Sarcotretes scopeli*) infesting *Scopelus glacialis* Rhdt.

By

Hector F. E. Jungersen.

I am sorry to have made a wrong statement in the paper named above saying on p. 3: "In the Davis Strait it (ɔ: the *Sarcotretes*) seems not to occur; among some 330 specimens of *Scop. glacialis* collected by the "Tjalfe" W. of Greenland, between ca. 63° and 71° Lat. N., none were found infested." This is not true.

A few days ago Mr. Ad. Jensen found some tubes which had been set apart from the material of *Scopelus glacialis* from the "Tjalfe-Expedition" handed over to me for examination. Evidently Mr. Jensen had forgotten the fact that he himself had observed the parasite and picked out the infested specimens of *Scopelus*, including them among the Crustaceans which were to be given to the Division of Arthropods of our Museum. Thus I naturally could not find parasites in any of the ca. 330 *Scopel. glacialis* caught between 63° and 71° Lat. N., every infested specimen having been taken out beforehand, and I think I cannot be blamed for the error I am now going to correct.

The tubes contained 9 *Scopelus glacialis*, from 20 to 52 mm. in length, each carrying an adult female of *Sarcotretes scopeli*;

one specimen had besides a pupal stage (C) attached to the margin of the right gill-cover (like the single case previously found and mentioned on p. 16 of my paper); another carried a Cyclops-stage (A) in front of the right ventral fin, and on the bottom of the tube was found one more of the same stage (A), dropped off from its host.

The adult female *Sarcotretes* of the *Scopelus* with the Cyclops-stage is coated with a beautiful colony of *Ichthyocodium*, while the remaining 8 are without any Hydroid. The basal membrane of the new *Ichthyocodium* encloses completely the external part of the *Sarcotretes*; it is thicker than in any specimen hitherto found, and its anastomosing tubes are numerous and often provided with blindly ending branchlets. A large number of the polypes are long (ca. 2 mm.) and slender; many or most of them carry medusæ-buds basally. The largest medusæ-buds are somewhat more advanced than those previously observed, not only larger (ca. 0,8 mm. in length, 0,224 mm. broad) but more medusiform, and attached by means of a longer and slender stalk; indications of a pair of additional marginal tentacles are quite distinct; thus my assumption (l. c. p. 23) that the medusæ, when liberated, might possess 4 marginal tentacles has been confirmed. The manubrium has still no mouth-opening, nor have I been able to observe genital cells.

Furthermore, among some Museum specimens of *Scop. glacialis*, captured several years ago at the coasts of Greenland, a single one, 37 mm. in length, labelled: Sukkertoppen, Müller 5/6 1890, has been found infested with an adult *Sarcotretes* without Hydroid. Probably it has been brought by some Eskimo to the Colonial Director R. Müller, who in 1889 sent a valuable collection of fishes to the Museum. The colony Sukkertoppen is situated at ca. 65° 25′ Lat. N., 52° 45′ Long. W.

The total number of the *Sarcotretes* in its final, inserted shape examined by me now amounts to 32 instead of 22, that of metamorphosis stages to 37. Of the 10 new adult females 5 protruded dorsally, all in front of the dorsal fin, 5 ventrally.

5 were found on the right, 3 on the left side and 2 in the (ventral) middle line (comp. p. 5).

The localities for the additional specimens are the following:

1. The association of the Parasitic Copepod with the Hydroid.

"Tjalfe's" Station Nr.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
336	64° 06′	55° 18′	1040—1100	900	8/5. 09.

2. The Parasitic Copepod, without the Hydroid.

"Tjalfe's" Station Nr.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
171	70° 41′	52° 07′	735	600	6/8. 08.
346 (2 spec.)	64° 22′	56° 00′		300—600	10/5. 09.
344, 345	64° 22′	55° 48′	1040	750—850	10/5. 09.
336	64° 06′	55° 18′	1040—1100	900	8/5. 09.
30 a.	63° 04′	56° 32′		375	7/6. 08.
434 (2 spec.)	62° 53′	54° 15′	1660	900—1125	9/6. 09.
Sukkertoppen	65° 25′	52° 45′			1889.

3. Stages in Development of the Parasitic Copepod.

A. Cyclops-stage.

"Tjalfe's" Station Nr.	Lat. N.	Long. W.	Depth of the Station in Metres	Depth of the Capture in Metres	Date
336 (2 spec.)	64° 06′	55° 18′	1140—1100	900	8/5. 09.
C. 2nd pupal stage					
434	62° 53′	54° 15′	1660	900—1125	9/6. 09.

Thus, the northern range of the *Sarcotretes* has been widened from 65° Lat. N. to 70° 41′ L. N., the western extension from 48° 26′ Long. W. to 56° 32′ Long. W. (cfr. l. c. p. 3); that is to say: this Parasitic Copepod not only occurs east and south of Greenland but also west of Greenland through the whole of Davis Strait right up to the entrance of the Umanak Fjord, now the

northernmost point recorded for its capture as well as for that of *Scopelus glacialis* (at Greenland). At the same time the area of the *Ichthyocodium* has been extended from 61° 49′ Lat. N. to 64° 06′ L. N., and from 14° 11′ Long. W. to 58° 18′ L. W. Probably the geographical distribution of this Hydroid will prove to be quite the same as that of the *Sarcotretes*.

9.—11.—1912.

Undersøgelser over entoparasitiske Muscidelarver hos Arthropoder. II.

Af

Dr. **J. C. Nielsen.**

Phryxe Rob Desv.

Slægten omfatter kun et mindre Antal Arter, hvis Værter, saavidt vides, er Sommerfuglelarver. Den eneste Art, om hvis Udvikling der foreligger udførligere Meddelelser, er den videst udbredte og hyppigst forekommende Art, *Ph. vulgaris* Fall, der angives som klækket af et betydeligt Antal forskellige Sommerfuglelarver, samt — men utvivlsomt med Urette — af en Løbebille (*Procrustes coriaceus* L.). Pantel[1]) henfører Arten til den sjette af de Grupper, hvori han efter Forplantningsmaaden inddeler de parasitiske Muscider, en Gruppe indeholdende Arter, der paa deres Værter enten afsætter Æg, i hvilke Larverne er fuldstændig udviklede, eller selve de udviklede Larver. Æggeskallen angives som blød og bøjelig, langstrakt, i Tværsnit rund, med noget tykkere Overside end Underside. Larven lever i første Stadium frit i Værten, men gennemborer senere Væggen til en af de større Trachéer; fra Hullet udgaar en Kitintragt, paa hvis Yderside findes et yderst fint Lag Epithelceller. Tragten omgiver Larvens Bagende, og denne ligger helt indhyllet i en Sæk af degenereret Fedtvæv. Naar Larven har hæftet sig fast i Nærheden af et Spirakel, øde-

---

[1]) I. Pantel: Recherches sur les Diptères à larves entomobies I (La Cellule XXVI 1910 p. 77, 81, 112, 122).

lægger den ved Tryk hele det Parti Trachéer, der findes ved dette Spirakel, og udvendig fra ses dette da omgivet af en mørk Plet.

Jeg har kun haft Lejlighed til at undersøge Udviklingen af *Ph. vulgaris* Fall, der saavidt mig bekendt er den eneste af Slægtens Arter, der hidtil er fundet her i Landet.

Phryxe vulgaris Fll.[1]).

Udvikling.

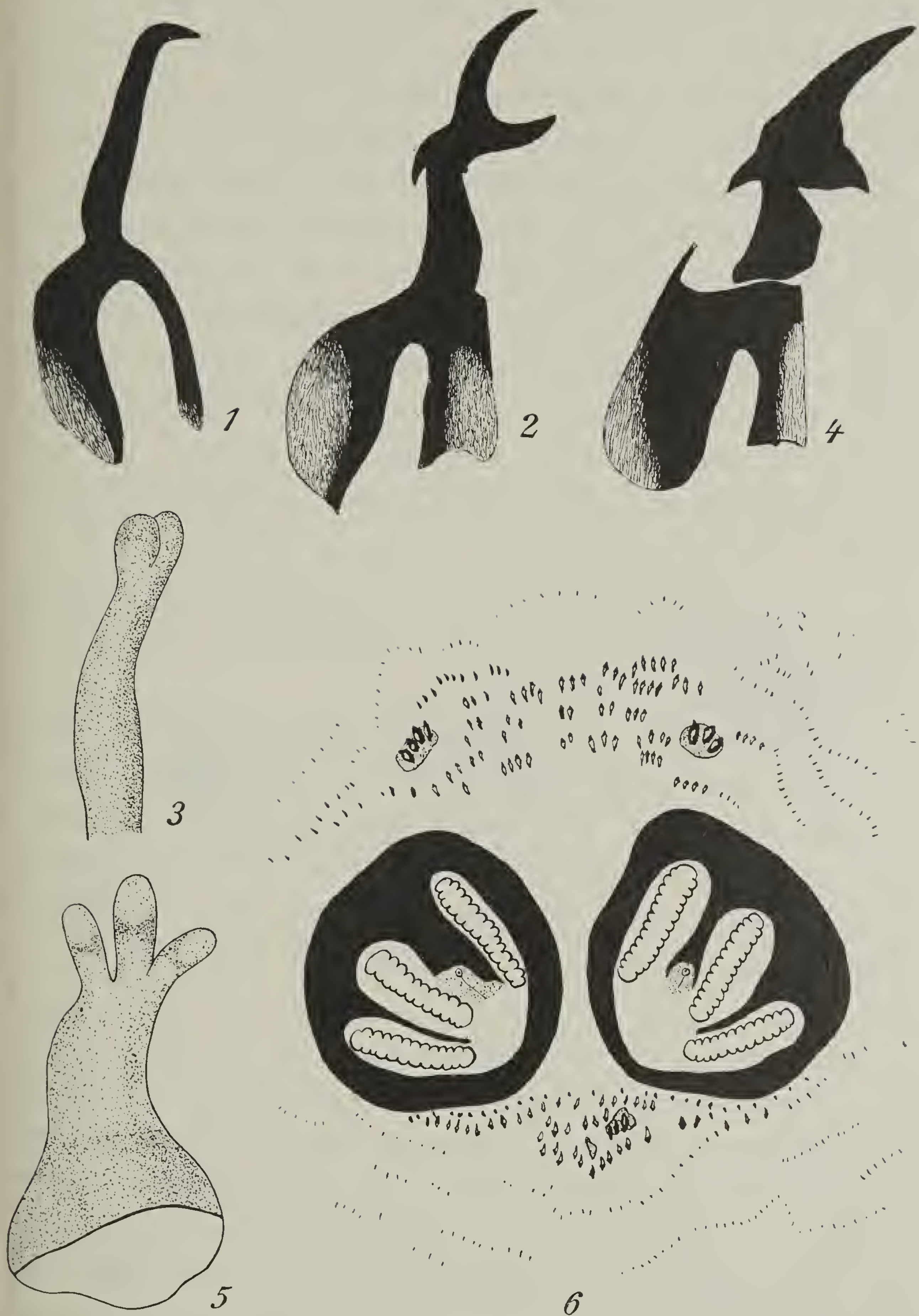
Larven i 1ste Stadium: Længde c. 3/4 mm. Forrandene af 2.—4. Led med brede Tornbælter, Forrandene af 5.—11. Led paa Bugsiden med smalle Bælter, Bagrandene af 5.—11. Led paa Bugsiden med Bælter, der bliver bredere henimod Larvens Bagende. Svælgskelettets forreste Del langstrakt og smalt, Spidsen bøjet i en næsten ret Vinkel (Fig. 1). Den forreste Del (ɔ: foran Udspringet af de nedre Svælgplader) omtrent Halvdelen af hele Svælgskelettets Længde.

2det Stadium: Længde 3 mm. Forrandene af 2.—4. Led med brede, 5.—11. Led med smallere Tornbælter, der paa 5.—6. Led findes baade paa Ryg- og Bugsiden, paa 7.—11. kun paa Bugsiden; Bagrandene af 5.—11. Led med Bælter, der kun paa 11. Led naar op paa Rygsiden. 12. Led med et bredt Bælte. Mundkrogene slanke, bøjede, Roden fortil med en svær, noget fremadrettet Torn og bagtil med en svagere, bagudrettet Tand (Fig. 2). Svælgskelettet dobbelt saa langt som Mundkrogene. Forspiraklernes atrium (Fig. 3) langstrakt, den inderste Halvdel svagt opsvulmet, Spidsen med to Knopper. Bagspiraklernes atrium krummet, Knopperne dybt adskilte, paa Midten opsvulmede.

3die Stadium. L. 7—11 mm. Forranden af 2det Led med et svagt Bælte, 3.—4. Led med bredere, i hvilke Tornene staar i nogenlunde lige Rækker, 5.—11. Led med smallere Bælter med Tornene i korte Buer, Bagranden af 5.—11. Led med smalle Bælter, der paa 11. Led naar op til Rygsiden, 12. Leds Forrand

---

[1]) De i nærværende Afhandling behandlede Arter er bestemte af Dr. J. Villeneuve.



Phryxe vulgaris Fll.

Fig. 1. 1. Stad. Svælgskelet. 2. 2. Stad. Svælgskelet. 3. 2. Stad. Forspirakel. 4. 3. Stad. Svælgskelet. 5. 3. Stad. Forspirakel. 6. 3. Stad. Bagspirakel.

med et bredt Bælte. For og bag Bagspiraklerne findes Tornrækker (Fig. 6), i hvilke Tornene aftager i Størrelse udadtil, og som gaar over i Tornbæltet paa Leddets Forrand. Foran hvert Spirakel findes en lille Kitinplade med et Par større Torne, undertiden findes ogsaa en eller to saadanne Plader bagved Spiraklerne. Mundkrogene (Fig. 4) plumpe; Inderranden paa den bageste Halvdel med et svagt Fremspring, overfor denne paa Yderranden en lille Knude; Roden for og bag med en bagudrettet Tand. De forreste Svælgplader halvt saa lange som Mundkrogene, de øvre af disses Længde. Forspiraklernes atrium (Fig. 5) bredt ved Roden, derefter indsnævret saaledes, at Spidsen er omtrent halv saa bred som Roden, endende med 3 korte Knopper; Spiraklet sidder indsænket i en lille Fordybning.

Bagspiraklerne (Fig. 6) af den almindelige, tredelte Type. Aandefelterne lige og regelmæssige, Trachéeaabningen skudt op i Indbugtningen i den inderste Bro.

Tøndepuppen: L. 7—8 mm. Bredde c. $2^1/_2$ mm. Sort; Overfladen glat og glinsende; hverken For- eller Bagspiraklerne fremstaaende. Gattet synligt som en meget lille, ubetydeligt fremspringende, sort Knop. De ydre Puppespirakler findes som ganske svage, mørke Knopper ved Bagranden af 5te Led. Analpapillen uregelmæssig 5-kantet, noget større end et Spirakel.

Biologi.

Jeg har fundet Larven snyltende om Foraaret hos Larverne af *Cheimatobia brumata* L., *Hibernia defoliaria* L. og *Drybota protea* Bhk. og om Efteraaret hos Larverne af *Eremobia ochroleuca* Esp., *Orgyia antiqva* L. og *Eupithecia innotata* Hfn.

Mine Iagttagelser har bekræftet Pantel's Meddelelser, med Undtagelse af hans Angivelse af Artens Æglægning, idet det af hans Afhandling synes at fremgaa, at han mener, at Snyltefluen lægger Æg paa Værten. Det er imidlertid aldrig lykkedes mig at finde Æg eller Spor til saadanne paa de af mig undersøgte inficerede Værtlarver.

Snylternes Tilstedeværelse i Værterne giver sig først til Kende ved smaa, uregelmæssige, sortfarvede Pletter paa Huden (Fig. 7 a), der angiver de Steder, hvor Snylterne har boret sig ind. Nogle Dage efter Indboringen fremkommer der omkring nogle af Spiraklerne uregelmæssig formede mørke Pletter (Fig. 7 b), der i Overensstemmelse med Pantel's Angivelser hidrører fra, at Snylterne har gennemboret og fæstet sig til de fra de paagældende Spirakler udgaaende Trachéestammer.

Arten har mindst to Generationer om Aaret. Hos Larven til *Drybota protea* Bhk. var Udviklingen følgende: Værtlarver med



Fig. 7. Hud af en *Drybota*-Larve med *Phryxe*-Larvens Indboringshul (*a*) og Spirakler (*b*) omgivne af en mørk Plet, fremkaldt af *Phryxe*-Larven.

Indboringshuller indsamledes den 9. Juni. Pletterne omkring Spiraklerne viste sig d. 13.—14. s. M., Snyltelarverne var fuldvoksne d. 16., og de fuldt udviklede Fluer kom frem den 30 s. M. De tilsvarende Tidspunkter var for en den 23. Juni indsamlet Værtlarve d. 25. og 29. s. M. og 12. Juli.

De Snyltere, der lever i Sommerfuglelarver, hvis Ædeperiode falder sent paa Efteraaret, som *Eupithecia innotata* Hfn., er først fuldvoksne sent paa Aaret og overvintrer som Pupper. De voksne Larver borer sig ud af Værterne og forpupper sig i Jorden.

Paa *Drybota*-Larverne fandtes indtil 12 Indboringshuller, men det højeste Antal Fluer, der kom til fuld Udvikling i den samme Vært, var 4. Hos *Eupithecia innotata* Hfn. udvikledes kun ét Eksemplar af Snylteren i hver Værtlarve.

Tachina Meig.

Den første Meddelelse om Udviklingen hos en Art af Slægten *Tachina* skyldes Th. Hartig[1]), der (1837) meddelte, at han havde klækket *T. larvarum* L. af et Antal forskellige Sommerfuglelarver, samt at Larverne levede enlig i smaa Værter, medens der i større kunde findes indtil 10 Larver sammen. Efter at Laboulbène[2]) derefter (1861) havde beskrevet sidste Larvestadium og Tøndepuppen af en *Tachina*, som han henførte til den af Meigen opstillede *T. villica*, der senere har vist sig identisk med den stærkt varierende *T. larvarum*, findes der i Literaturen — bortset fra Beretninger om Klækninger — kun faa og spredte Meddelelser om *Tachina*-Arternes Biologi og Udvikling. I en lille Afhandling, der indeholder foreløbige Meddelelser om de ved Gipsy moth parasite laboratory i Massachusetts foretagne Undersøgelser over Snyltefluer har C. H. T. Townsend[3]) givet korte Meddelelser om nogle Arters Æg og Æglægning (*T. larvarum* L., *T. utilis* Towns. og *T. clisiocampæ* Towns.), og Pantel[4]) henfører *T. larvarum* L. og *T. rustica* Fall. til en Gruppe Arter, der aflægger store hvide Æg paa Værterne. I Sommeren 1911 udkom en stor Beretning af Howard & Fiske om de ved Gipsy moth parasite laboratory indtil da opnaaede Resultater med Indførelse til

---

1) Th. Hartig: Ueber die parasitischen Zweiflügler des Waldes (Jahresbericht über die Fortschritte der Forstwissenschaft im Jahre 1836—37, 1837, p. 275).

2) A. Laboulbène: Métamorphoses d'une Mouche parasite. (Ann. Soc. entom. de France. 4 Série, Tome 1, 1861, p. 231).

3) C. H. T. Townsend: A Record of Results from Rearings and Dissections of Tachinidæ (U. S. Dept of Agriculture. Bureau of Entomology Technical Series No. 12, Part VI).

4) J. Pantel l. c. p. 34.

Nordamerika af *Porthesia dispar* L. og *Euproctis chrysorrhoea* L.'s Snyltere[1]). Her findes et Par korte Meddelelser om *T. larvarum* L.; Larven forlader Æggeskallen gennem et uregelmæssigt Hul i den ene Pol og borer sig ind gennem Værtens Hud. Den fuldvoksne Snyltelarve forlader altid Værten, forinden den forpupper sig, i hvilket Forhold den siges at afvige fra den nærstaaende *Tricholyga grandis* Zett., der som Regel forpupper sig inde i Værten. Med Hensyn til den af mig i 1909[2]) beskrevne Larve af *T. larvarum* L. henviser jeg til en senere Berigtigelse[3]), efter hvilken den paagældende Larve har vist sig at tilhøre en anden Snylteflueart (*Ernestia radicum* F.).

Alle de her behandlede Arter har jeg fundet snyltende hos Sommerfuglelarver; de henhører alle til Pantel's 1ste Gruppe, der omfatter: „Espèces collant sur le corps de l'hôte un œuf court, macrotype". Larverne aabner Æggeskallerne ved i den ene Pol at skære et uregelmæssigt Laag af Æggeskallernes Overside.

Laaget frembringes ved Hjælp af Spidsen af Svælgskelettets Tand, der paa den øverste Rand er fint savtakket[4]), (Fig. 12). Efter at Larven har aabnet Æggeskallen, borer den sig ind i Værten. Dens Forhold til denne svarer ganske til hvad jeg tidligere har fremstillet for *Ptychomyia selecta* Meig.'s Vedkommende.

---

[1]) L. O. Howard & W. Fiske: The importation into the United States of the Parasites of the Gipsy Moth and the Brown Tail Moth (U. S. Dept of Agriculture, Bureau of Entomology Bulletin No. 91).

[2]) J. C. Nielsen: Iagttagelser over entoparasitiske Muscidelarver hos Arthropoder (Entomol. Meddelelser 2. Række, Bd. 4, 1909 p. 60).

[3]) J. C. Nielsen: A correction concerning Tachina larvarum L. to „Iagttagelser over entoparasitiske Muscidelarver hos Arthropoder" (Ibid. p. 367).

[4]) Pantel (l. c. p. 44) synes at mene, at Svælgskelettets Savtakning særlig spiller en Rolle ved Gennemboringen af Værtens Hud; jeg er nærmest tilbøjelig til antage, at den kun — eller ialtfald fortrinsvis — kommer til Anvendelse ved Æggeskallens Aabning; Tænderne savnes — saavidt hidtil bekendt — hos de Larver, der borer sig ind i Værten gennem et Hul i Æggeskallens Bund, og findes kun hos dem, der forinden de borer sig ind aabner Æggeskallen ved at skære et Laag af eller frembringe et stort Hul i denne.

Tachina larvarum L.

Ægget. Æggeskallen (Fig. 8) er c. 3/4 mm. lang og c. 1/2 mm. bred, hvid, uden Skulptur. Formen er aflang-oval eller noget ægformet. Undersiden flad, Oversiden hvælvet. I Æggets forreste Pol har jeg et Par Gange fundet et lille Vedhæng (Fig. 8 a), der formentlig er det samme Organ som Pantel[1]) betegner som conducteur micropylaire, og som han hos flere Snyltefluer har fundet paa Æg, der var dissekerede ud af Fluerne eller ganske nylig lagte. Som Figuren viser, har jeg fundet Vedhænget ogsaa paa Æg, hvori Larven allerede er fuldt udviklet. Hos andre *Tachina*-Arters Æg har jeg ikke bemærket det.

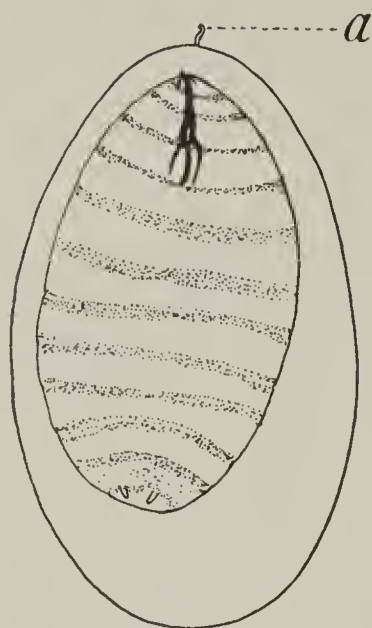


Fig. 8.
Tachina larvarum L.
Æg med en fuldt udviklet Larve. *a.* Vedhænget i Æggeskallens ene Pol.

Larven i 1ste Stadium: Længden af den i Ægget liggende Larve er ca. 2/3 af Æggeskallens, og Larven tiltager ikke synderligt i Størrelse i dette Stadium. Forranden af 2.—11. Led med brede, regelmæssige Tornbælter, af hvilke de, der findes paa 2.—5. Led, bestaar af større og tættere sammenstillede Torne end Bælterne paa de følgende Led; Bagrandene af (6). 7.—11. Led med svagere Bælter, i hvilke Tornene er mindre end i Bælterne paa Forrandene. Paa de mellemste Leds Sider undertiden enkelte isolerede Partier af større Torne; 12. Led undtagen Spidsen omkring Spiraklerne besat med større og mindre Torne, der samler sig i uregelmæssige Bælter.

I 12. Leds Bagrand findes 2 smaa Kitintappe og paa Undersiden i en Bue over Midten af Leddet 4 lignende Tappe (Fig. 9); disse er langstrakte, cylindriske og noget bredere ved Roden (Fig. 10). Deres Betydning er mig uklar; de findes kun hos Larver i 1ste Stadium, men forekommer foruden hos Slægten *Tachina*

---

1) J. Pantel l. c. p. 42—43.

tillige hos flere andre Snyltefluer (*Ptychomyia selecta* Meig., *Bactromyia aurulenta* Meig., *Carcelia gnava* Meig. o. a.). Deres Forekomst falder, saavidt jeg kan se, sammen med Forekomsten af Savtakningen paa Svælgskelettets Tand; denne findes — som ovenfor berørt — hos saadanne Arter, der aabner Æggeskallen andre Steder end i Bunden, og hvis Indboringshul ligger helt eller delvis udenfor Æggeskallen, medens Svælgskelettets Tand er glat hos de Arter, der trænger ind i Værterne gennem Æggeskallens Bund. Man kan

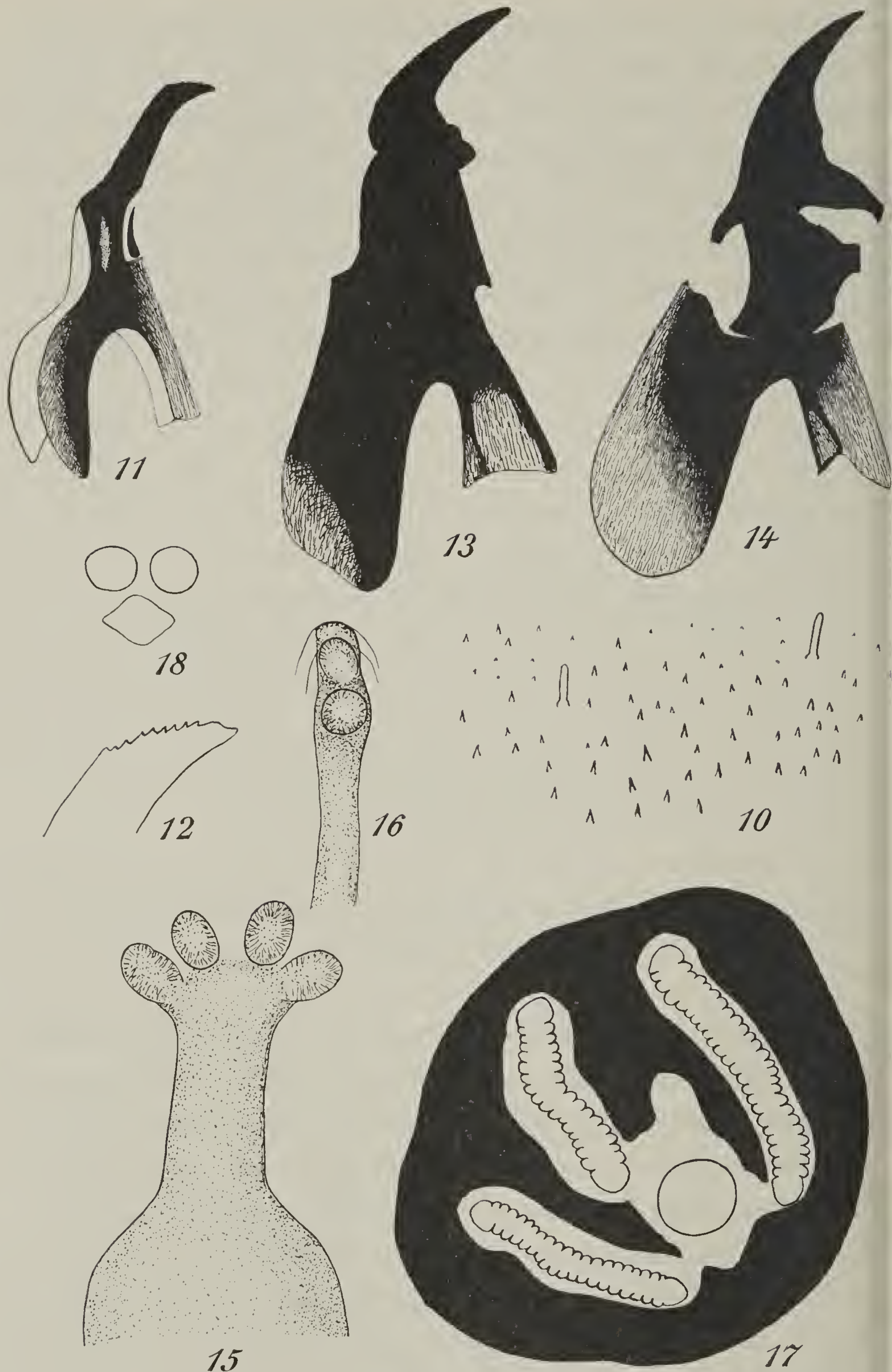


Fig. 9. *Tachina larvarum.* Bagenden af en Larve i 1ste Stadium. *a.* Kitintappene.

maaske antage, at Tappene tjener til at støtte eller fastholde Larven i den Periode, i hvilken den har strakt sig ud af Æggeskallen og er beskæftiget med at frembringe Hullet i Værtens Hud.

Svælgskelettets forreste Del (foran Udspringet af de nedre Svælgplader) udgør Halvdelen af hele Længden og danner en stump Vinkel med den bageste Del (Fig. 11). Svælgpladerne er omtrent lige lange. Ved Siden af hvert Bagspirakel findes to smaa, uregelmæssige, sorte Kitinplader; Bagspiraklernes atrium er cylindrisk, omtrent 3 Gange saa langt som bredt.

2det Stadium: Længde 3—4 mm. Tornbælterne findes paa Forrandene af 2.—11. Led; de er bredest paa 2. og 3. Led og af-



Tachina larvarum L. Fig. 10. 1. Stad. Hud fra 12. Led med Torne og to Kitintappe. 11. 1. Stad. Svælgskelet. 12. 1. Stad. Spidsen af Svælgskelettet. 13. 2. Stad. Svælgskelet. 14. 3. Stad. Svælgskelet. 15. 3. Stad. Forspirakel. 16. Spidsen af et Forspirakel set fra Siden. 17. 3. Stad. Bagspirakel. 18. Tøndepuppe, Bagspiraklerne og Analtappen.

tager stærkt i Bredde bagud og forsvinder paa Rygsiden af 6.—11. Led; Bagrandene af 7.—11. Led med Tornbælter, der er smallest paa 7. Led, hvor Bæltet kun findes paa Bugsiden, og tiltager bagud i Bredde; 12. Led, undtagen Forranden og Spidsen, besat med Torne. Mundkrogenes Rod bagtil afrundet, fortil knudeformet, Inderranden temmelig skarpt vinkelbøjet, hen imod Roden med en lille Knude. Svælgskelettet c. $2^1/_2$ Gang saa langt som Mundkrogene (Fig. 13). De øvre Svælgpladers Rand fortil med et tandformet Fremspring; de nedre Svælgplader mindre stærkt divergerende mod de øvre, saaledes at Svælgskelettet set fra Siden bliver temmelig smalt. Forspiraklerne mangler. Bagspiraklernes atrium cylindrisk, omtrent dobbelt saa langt som bredt, med to Knopper.

3die Stadium: Længde indtil 14 mm. Tornbælterne findes paa Forranden af 2.—11. Led, bredest paa de forreste, og paa Bagranden af 8.—11. Led; 12. Led undtagen omkring Spiraklerne besat med Torne. Mundkrogene saa lange som de øvre Svælgplader; Roden bagtil udtrukket i en kort, bagudrettet Tap og fortil i en svagt bagudrettet Forlængelse, Inderranden nedenfor Midten med en svag Knude (Fig. 14). Forspiraklernes atrium fladt, Roden stærkt udvidet, med 4 eller 5 Knopper (Fig. 15, 16); Antallet kan variere saaledes, at den samme Larve har 4 Knopper i det ene Spirakel og 5 i det andet, men i Reglen findes samme Antal, 4—5, i begge Spirakler. Bagspiraklerne (Fig. 17) tilhører den almindelige Type med 3 Aandefelter; Rammen har et smalt Indsnit ovenfor Trachéeaabningen; der kan træffes Larver, hos hvilke et af Spiraklerne kun har to Aandefelter[1]). Aandefelterne korte, regelmæssige og svagt bøjede[2]).

[1]) Jfr. om lignende abnorme Spirakler hos *Ptychomyia selecta* Meig. J. C. Nielsen 1909, p. 32.

[2]) Fra the Gipsy Moth Parasite Laboratory har jeg bl. a. modtaget et Præparat af Bagspiraklerne fra en Tøndepuppe af *T. larvarum* L., i hvilket det inderste Aandefelt omtrent paa Midten er afbrudt ved en lille Bro; jeg har ikke paa noget af de talrige danske Eksemplarer af *T. larvarum* L., som jeg har undersøgt, fundet nogen tilsvarende Afbrydelse eller Indsnævring af Aandefeltet.

T ø n d e p u p p e n: Længde 6—12 mm., Bredde $2^1/_2$—5 mm.; aflang oval, eller cylindrisk, undertiden ganske svagt krummet, noget fladere paa Bugsiden end paa Rygsiden. Overfladen glinsende, fint naaleridset, Forspiraklerne fremstaaende som to smaa spidse Tappe. Bagspiraklerne svagt ophøjede, Analtappen uregelmæssig firkantet, større end et Spirakel (Fig. 18); Gattet tydeligt, men ikke fremstaaende. De ydre Puppespirakler findes som et Par tydelige men smaa Tappe ved Bagranden af 5. Led.

Biologi.

I Sommeren 1911 indsamlede Lærer P. Kryger paa et Sted i Fortunens Indelukke i Dyrehaven, hvor *Zygæna lonicerœ* Esp. for nogle Aar siden var optraadt i meget stort Antal, men hvor den nu var i Tilbagegang[1]), 460 Stkr. *Zygæna*-Kokoner, som han overlod mig til nærmere Undersøgelse. Disse Kokoner fordelte sig saaledes:

Kokoner, hvoraf der kom Zygæner	116 Stkr.
— — — — Tachina larvarum L.	255 —
— — — — forskellige Ichneumoner	35 —
Tomme Kokoner	54 —
	460 Stkr.

Antallet af de paa de enkelte Larver afsatte *Tachina*-Æg varierede fra 1—22; de var hyppigst anbragte fortil paa Larverne, ofte klumpede sammen paa Hovedet og Brystleddene, men fandtes ogsaa længere tilbage paa Værtens Krop og Sugefødder. Det største Antal Fluer, der kom frem af en enkelt Kokon var 4, saaledes at et betydeligt Antal af Æggene eller Larverne maatte være omkomne under Udviklingen.

For at undersøge dette Forhold nærmere aabnede jeg 150 Kokoner, efter at Snylterne var udviklede, og talte de Æg, der fandtes afsatte paa Larvehudene og de Fluepupper, som laa inde i Kokonerne. Sidestaaende Tabel viser Resultatet:

---

[1]) Tilbagegangen skyldes efter Hr. Krygers Iagttagelser særlig en lille Proctotrypide, *Telenomus zygœnœ* Kieff., der snyltede i Zygænaens Æg.

Af omtrent to Trediedele af Kokonerne kom kun én Snylter ud, trods det at der blandt de Værter, der laa i disse Kokoner, foruden 15 med kun ét Æg fandtes Eksemplarer med indtil 16 Æg hver; af omtrent en Femtedel af Kokonerne udvikledes to Snyltere; af 11 Kokoner tre og kun af en eneste, der indeholdt en *Zygæna*-Larve med 13 Æg, fire Tachinaer.

Foruden disse Snyltefluer klækkedes endvidere 6 Snyltehvepse af Værter, der var besatte med Flueæg. Ialt var paa de 150 Værtlarver afsat 767 *Tachina*-Æg, og af Kokonerne klækkedes 144 Fluer (samt 6 Snyltehvepse), saaledes at Antallet af de Snyltefluer, som det lykkedes at fuldføre hele Udviklingen, udgjorde lidt mere end en Femtedel af Æggenes.

Fluernes Størrelse varierede stærkt, de mindste var 5 mm., de største lidt

Tabel over Forholdet mellem de paa *Zygæna*-Larverne afsatte Æg af *Tachina larvarum* L. og de af *Zygæna*-Kokonerne fremkomne Snyltere.

Antallet af klækkede Fluer (Number of flies bred from the cocoons)	Antallet af de paa *Zygæna*-Larverne afsatte Æg. (Number of eggs deposited on the *Zygæna* caterpillars). 1 Æg	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	22
Tachina larvarum 1. Eks. . .	15	26	16	7	6	9	5	2	3	1	"	3	1	"	3	1	"	"
— — 2. — . . .	"	5	7	5	3	2	4	1	"	1	2	1	"	2	"	"	"	1
— — 3. — . . .	"	"	"	4	"	"	"	2	1	1	"	"	"	1	1	"	1	"
— — 4. — . . .	"	"	"	"	"	"	"	"	"	"	"	"	1	"	"	"	"	"
Ichneumoner	"	"	3	1	1	1	"	"	"	"	"	"	"	"	"	"	"	"

over 13 mm. Dette Størrelsesforhold afhænger naturligvis af, om de paagældende Eksemplarer har udviklet sig enligt eller om der har været flere Snyltere i den samme Vært. Dog viste det sig i det sidste Tilfælde, at Fluernes Størrelse ikke reduceredes ligeligt, men at en eller to af dem opnaaede en Størrelse, der ikke afveg fra de enlige Eksemplarers, medens Resten var Dværgeksemplarer. Dette er ogsaa ret naturligt, thi alle Snylterne borer sig ikke ind paa samme Tid; de større Eksemplarer hidrører fra de tidligst indborede Larver, de smaa fra Larver, der er trængte ind i Værter, hvor de tidligere indborede Snyltere allerede har fortæret det meste af Værtens Indhold, men dog levnet saameget, at de andre kunde fuldende Udviklingen, om de end ikke kunde opnaa nogen betydelig Størrelse. Et stort Antal saadanne sent indborede Snyltere dør naturligvis under Udviklingen enten af Mangel paa Næring, pressede ihjel af de ældre Larver, eller af andre Grunde[1]).

De fuldt udviklede Snyltere forpuppede sig — i Modsætning til Howard & Fiske's ovennævnte Meddelelse — saa godt som udelukkende inde i de dræbte Værters Hud, og kun i faa Tilfælde fandtes enkelte Kokoner liggende frit i *Zygæna*-Kokonerne.

Fluerne kom frem 14 Dage til 3 Uger efter Forpupningen.

De ovenfor beskrevne *Zygæna*-Snyltere hører til *T. larvarum*'s Sommergeneration. Om Efteraaret har jeg truffet en anden Generation i Larverne til *Spilosoma lubricipeda* L.; her var Larveudviklingen afsluttet i September Maaned, og Fluerne kom frem enten samme Efteraar eller næste Aar i Mai.

Tachina impotens Rond.

Ægget: Som hos *T. larvarum* L.

Larven i 1ste Stadium: Tornvæbningen som hos *T. larvarum* L. Af de Kitintappe, som hos denne findes paa sidste Led, ses hos nærværende Art tillige et Par paa Undersiden af 2.—11. Led; paa 12. Led findes samme Antal som hos *T. larvarum* (Fig. 19).

---

[1]) Jfr. herom og om lignende Forhold J. Pantel l. c. p. 176—177.

Svælgskelettet ikke bøjet; den bageste Del ½ Gang saa lang som den forreste; de øvre Svælgplader meget længere end de nedre (Fig. 20), Spidsen bredt afrundet. Bagspiraklerne som hos *T. larvarum* L.

2det Stadium: L. 3—4 mm. Forrandene af 2.—11. Led med Bælter, der er bredest paa 2.—5. Led og meget fine paa 7.—11. Led, paa 6.—11. Led findes de kun paa Bugsiden; Bagranden af (6.) 7.—11. Led med Bælter, der tiltager i Bredde



Fig. 19. *Tachina impotens* Rond. 1. Stad. Bagenden.

bagud; 12. Led med et Tornbælte paa Midten. Mundkrogene noget slankere end hos den foregaaende Art, Knuden paa Inderranden mere fremtrædende (Fig. 21); Svælgskelettet lidt mere end dobbelt saa langt som Mundkrogene, de øvre Svælgplader uden Fremspring paa Randen, de nedre stærkere divergerende mod de øvre end hos *T. larvarum* L. Bagspiraklerne som hos denne Art.

3die Stadium: Længde indtil 14 mm. Forranden af 2.—6. Led med Bælter, der er bredest paa Siderne, 7.—11. Led med Torne kun paa Siderne. 12. Led med et smalt Bælte paa Midten. Mundkrogene kortere end de bageste Svælgplader, noget



Tachina impotens Rond.
Fig. 20. 1. Stad. Svælgskelet. 21. 2. Stad. Svælgskelet. 22. 3. Stad. Svælgskelet. 23. 3. Stad. Forspirakel. 24. 3. Stad. Bagspirakel.

plumpere end hos *T. larvarum* og med noget stærkere Tand paa Inderranden (Fig. 22). Forspiraklernes atrium fortil bredere end hos *T. larvarum*; Modsætningen mellem Roden og det ydre flad-

trykte Parti mindre end hos den foregaaende Art; 5 Knopper (Fig. 23). Bagspiraklerne afviger fra den nævnte Arts ved, at Rammen springer frem overfor Trachéeaabningen, og ved at Aandefelterne er længere og smallere samt noget stærkere bøjede (Fig. 24).

Tøndepuppen: Længde $5^1/_2$—$8^1/_2$ mm., Bredde $2^1/_2$—4 mm. Kan ikke adskilles fra den foregaaende Arts.

Biologi.

Jeg har fundet denne Art snyltende i Larven af *Orgyia antiqva* L., der i en Række Aar har optraadt paa en Tjørnehæk i Københavns Omegn. I fire Aar — fra 1907 — havde jeg søgt efter Snyltere hos Larverne, der for hvert Aar blev talrigere; først i Slutningen af August 1911 lykkedes det mig at finde et Par enkelte, fuldvoksne *Orgyia*-Larver, der hver bar et Æg af *T. impotens* Rond. Aaret efter, i 1912, var Orgyiaerne tiltagne i Antal og havde næsten helt afløvet en Del af Hækken og nogle indenfor denne staaende smaa Blommetræer. I Løbet af August Maaned lykkedes det mig at indsamle en Del *Orgyia*-Larver med Æg, men de inficerede Larver var i det hele taget sjældne; en løselig Optælling viste, at knap en halv Snes Procent af dem var angrebne af Snylteren. Som Følge af Snylterens Sparsomhed var Larverne hver forsynede med kun ét enkelt Æg — en enkelt dog med to. — Æggene sad næsten alle paa Larvernes Bugside og fortil paa Larven; hos et Par Larver dog paa Sugefødderne.

Æggene aflagdes, som ovenfor sagt, kun paa fuldvoksne Larver. Som Følge heraf skete det hyppig, at Orgyiaerne forpuppede sig, forinden Snylterne var trængte ind, saaledes at de derved undgik at blive dræbte af disse; af samme Grund forpuppede den overvejende Del af Værtlarverne sig, forinden de blev dræbte af Snylterne, saaledes at disse fuldendte deres Udvikling inde i Pupperne.

For 34 *Orgyia*-Larver med Æg, der var indsamlede i Dagene fra 8.—15. August, viste Forholdet sig saaledes:

Forpuppede, førend Tachinalarverne havde boret sig ind	21
Forpuppede, efter at Tachinalarverne var trængt ind	9
Dræbte af Tachinalarverne før Forpupningen	4
Ialt	34

Efter at Snyltelarven er fuldvoksen, borer den sig ud af *Orgyia*-Puppen og forpupper sig inde i Spindet; en enkelt Puppe fandtes dog inde i Værtens Puppe.

Trods det, at Larveudviklingen foregaar saa sent paa Aaret som i August—September, kommer Fluerne alligevel frem samme Aar i Oktober, efter en Puppetid af c. 1 Maaned.

Tachina macrocera R. D.[1]).

(*T. nitidiventris* Zett.)

Ægget som hos *T. larvarum* L.

Larven i 1ste Stadium: Tornbælternes Fordeling paa Leddenes Forrande svarer til Forholdet hos *T. larvarum* L.; paa Bagrandene af 3.—5. Led paa Rygsiden Bælter, i hvilke Tornene kun er lidt mindre end paa de samme Leds Forrande, paa Bagrandene af 6.—11. Led Bælter, hvis Torne er mindre end de paa Forrandene. Kitintappenes Fordeling som hos *T. larvarum* Rond. Svælgskelettet ligner i høj Grad *T. impotens*, men er noget kraftigere og bagtil noget bredere (Fig. 25); den forreste Del udgør $^1/_3$ af hele Længden.

2det Stadium; Da jeg af dette kun besidder en sammenkrøllet Larvehud, som er udpræpareret af en Tragt, der omsluttede en Larve i 3die Stadium, kan jeg intet meddele om Tornbælternes Fordeling. Mundkrogene er bredere ved Roden, men slankere i Spidsen end hos de to foregaaende Arter; de øvre Svælgpladers Rand fortil med en stor Tand og lidt bagved denne en mindre som hos *T. larvarum* (Fig. 26); Svælgpladerne lidt mere end

[1]) Jfr. J. Villeneuve: Sur Tachina macrocera R. D. (Dipt. Tachin.) Zeitschr. f. wiss. Insektenbiologie Bd. VIII, 1912, p. 296.

dobbelt saa lange som Mundkrogene. Bagspiraklerne som hos denne Art.



Tachina macrocera Rob. Dew.

Fig. 25. 1. Stad. Svælgskelet. 26. 2. Stad. Svælgskelet. 27. 3. Stad. Svælgskelet. 28. 3. Stad. Forspirakel. 29. 3. Stad. Bagspirakel. 30. Tøndepuppe; Bagspiraklerne og Analtappen.

3die Stadium: L. indtil 12 mm. Tornbælterne findes paa Forranden af 2.—11. Led, paa 9.—11. dog kun paa Bugsiden, samt

paa Bagranden af 5.—11. Led, paa 5.—8. Led kun paa Bugsiden; 12. Led med et bredt Tornbælte. Mundkrogene kortere end de øvre Svælgplader, omtrent som hos *T. impotens*; Tanden paa Inderranden noget mere fremtrædende end hos denne (Fig. 27). Forspiraklerne slanke, med 5 langstrakte Knopper (Fig. 28). Bagspiraklernes Ramme med en bred Indbugtning overfor Trachéeaabningen; Aandefelterne kortere, uregelmæssige (Fig. 29).

Tøndepuppen: L. c. 7—10 mm. Bredde c. 3 mm. Brunlig, undertiden hos mindre Eksemplarer lys brungul; iøvrigt som hos *T. larvarum* L., dog ligger Bagspiraklerne lidt længere fremme paa Rygsiden af sidste Led end hos denne Art. Analpapillen danner en tværliggende Fure, omgivet af et stærkt tværrynket Felt (Fig. 30).

Biologi.

En Del Eksemplarer af Fluen er hjembragt fra Østgrønland (Hekla Havn) af Amdrup Expeditionen, klækkede af Deichmann af Larverne til *Dasychira groenlandica* Woche (5/1892). „Danmark" Expeditionen hjemførte ligeledes fra Østgrønland (76° 46' N. L.) flere *Dasychira*-Larver med Æg eller Larver af denne Art, indsamlede af Fritz Johansen. Een Larve bar seks Æg paa Siderne eller Undersiden af Thoraxleddene, en anden indeholdt 3 Larver i 3die Stadium, en tredie og fjerde hver en enkelt, ligeledes i 3die Stadium. Alle Værtlarverne var vistnok voksne og skulde have forpuppet sig samme Sommer, som de angrebes af Snylterne.

Jeg har dernæst selv fundet *T. macrocera* R. D. i Juni i Klitterne ved Tidsvilde, hvor den snyltede i fuldvoksne Larver til *Malacosoma castrensis* L. Paa hver Larve fandtes kun et eller to Æg afsatte, og de Værter, som det lykkedes mig at finde, forpuppede sig alle med Snylterne inde i sig. Fluerne kom frem i den første Halvdel af August.

Tachina vidua Meig.

Udvikling.

Tøndepuppen: Afviger fra *T. larvarum* L. ved at Farven er brunlig, samt ved at Analpapillen er mindre end Bagspiraklerne. Disse viser ogsaa nogle Forskelligheder fra den nævnte Art, idet Spiraklets Ramme ovenfor Traheeaabningen er fladt indbugtet, og ved at Broerne er forholdsvis spinklere og Aandefelterne smallere og stærkere bøjede. Ved disse Karakterer vil Larven i 3die Stadium kunne adskilles fra de andre her beskrevne *Tachina*-Arter (Fig. 31).



Fig. 31. *Tachina vidua* Meig. 3. Stad. Bagspirakel.

Biologi.

Klækket af Larven til *Macrothylacia rubi* L.

Digonochæta Rond.

Slægten *Digonochæta* omfatter kun et Par Arter; den ene af disse *D. setipennis* Fall., har været kendt som Snylter hos Ørentviste siden Bohemann[1]) i 1850 og 51 meddelte, at han havde fundet en Ørentvist, hvis Bagkrop var usædvanlig stærkt opsvulmet, samt at han Dagen efter, da Dyret var stukket paa en Naal, fandt en Fluepuppe stikkende frem mellem dens Bryst og Bagkrop, af

---

[1]) Bohemann: Iakttagelser rørande några Insektarters Metamorfose (Öfversigt af Kungl. Vetenskaps Akademiens Förhandlinger 7, 1850 p. 211) og Om Utvecklingen af Tachina setipennis (ibid. 8, 1851 p. 153).

hvilken Puppe han i Mai Maaned næste Aar klækkede et Eksemplar af *D. setipennis* Fall.

Faa Aar senere offentliggjorde G. Newport[1]) en lille Meddelelse om en Snylteflue, som han havde klækket af Ørentviste, indsamlede i Londons Omegn; Arten beskrives som ny under Navn af *Metopia forficulæ*. Senere Systematikere har ikke kunnet udrede, hvad det var for en Art, Newport har haft for sig, da hans Beskrivelse er for kortfattet til at gøre den kendelig, og hans Typeeksemplar neppe existerer længere. Det er sikkert, at den ikke er en *Metopia*, og den henføres af Forfatterne til Katalog der paläarktischen Dipteren III med Tvivl til Slægten *Digonochæta*. Dette er imidlertid neppe rigtigt, da *D. setipennis* Fll., som Forfatterne øjensynlig har tænkt paa, ikke lægger sine Æg paa Ørentvistene, medens dette var Tilfældet med den af Newport iagttagne Art.

Næste Gang, Fluelarver i Ørentviste omtales, er da Meinert[2]) i 1863 kort meddelte, at han ved sine anatomiske Undersøgelser af Ørentviste fire Gange havde fundet Fluelarver liggende inde i saadanne, nemlig to Gange hos *Forficula auricularia* L. og to Gange hos *F. acanthopygia* Gené. Denne Meddelelse angaar sandsynligvis *D. setipennis* Fll., men det bør dog bemærkes, at der i Ørentviste ogsaa findes andre Snyltefluer, nemlig *Rhocodineura antiqva* Meig., som Rodzianko[3]) har fundet hos *Forficula tomis* Kol. og *Ceromasia vicinalis* Pand., der af Pantel[4]) opgives som snyltende i Ørentviste.

Digonochæta setipennis Fall. opgives foruden af Ørentviste tillige som klækket af forskellige Sommerfuglelarver. Med Hensyn

---

[1]) G. Newport: Notes on the dipterous parasites which attack the common Earwig and the Emperor Moth (Proc. Linn. Soc. London II, 1855 p. 247).

[2]) Fr. Meinert: Anatomia Forficularum, Kbhvn. 1863, p. 30.

[3]) W. Rodzianko: Ueber den Parasitismus der Larven von Roeselia antiqva Meig. im Innern der Larven von Forficula tomis Kol. (Horæ Soc. Entom. Ross. XXXI, 1897, p. 72).

[4]) J. Pantel l. c. p. 46.

til Udviklingen angiver Pantel[1]), at Fluen antagelig lægger sine Æg eller sine Larver paa Steder, hvor Værterne færdes, og at de unge Larver, i hvis Hud er indlejret Kitinplader, selv opsøger Ørentvistene og borer sig ind i disse. Indboringen sker gennem en Ledhud, og Snylteren ligger fæstet til Værten ved en fra Indboringshullets Rande udgaaende Tragt. Ved Hudskiftet bliver de afkastede Ledhude liggende fuldt udstrakte inde i Tragten.

Digonochæta setipennis Fall.

Udvikling.

Larven i 1ste Stadium: Ligesom Pantel har jeg fundet 1ste Stadiums Larvehud liggende udbredt inde i Tragtens Vægge (Fig. 32). Paa Larvehuden fandtes dels en Række efter hinanden følgende store Kitinskiver (Fig. 34), dels nogle fra disse udgaaende Rækker af mindre Plader, samt enkelte Grupper af saadanne mindre Plader. Jeg antager, at de store Kitinskiver har beklædt Bugsiden paa Leddene, og at de derfra udgaaende Rækker har strakt sig op ad Leddenes Sider og at Pladerne paa Rygsiden har samlet sig i Grupper. De store Skiver bestaar af et svagt bøjet, brunligt Kitinstykke, i hvilket er indlejret Rækker af langstrakte, i den bagudvendte Spids stærkere kitiniserede Smaaplader af samme Form som de, der fandtes i Rækkerne og i Grupperne; paa de første 3 Skiver findes Smaapladerne kun i en enkelt Række, men paa de følgende findes 2 eller 3 Rækker. Bag dette Parti bestaar Skiven af et lysere, i Bagranden nedadrundet Parti, der er besat med et Antal smaa afrundede Kitingryn. Foran Skiverne, med Undtagelse af de forreste, findes enkelte smaa, meget spidse bagudrettede Torne, hvis Rod løber ud i en langstrakt, lysere Forlængelse. Svælgskelettet fandtes liggende foran Larvehuden; det bestod af en langstrakt, i Spidsen smallere Plade, der bagtil delte sig i to korte Svælgplader, der i Spidsen var udadbøjede (Fig. 33).

---

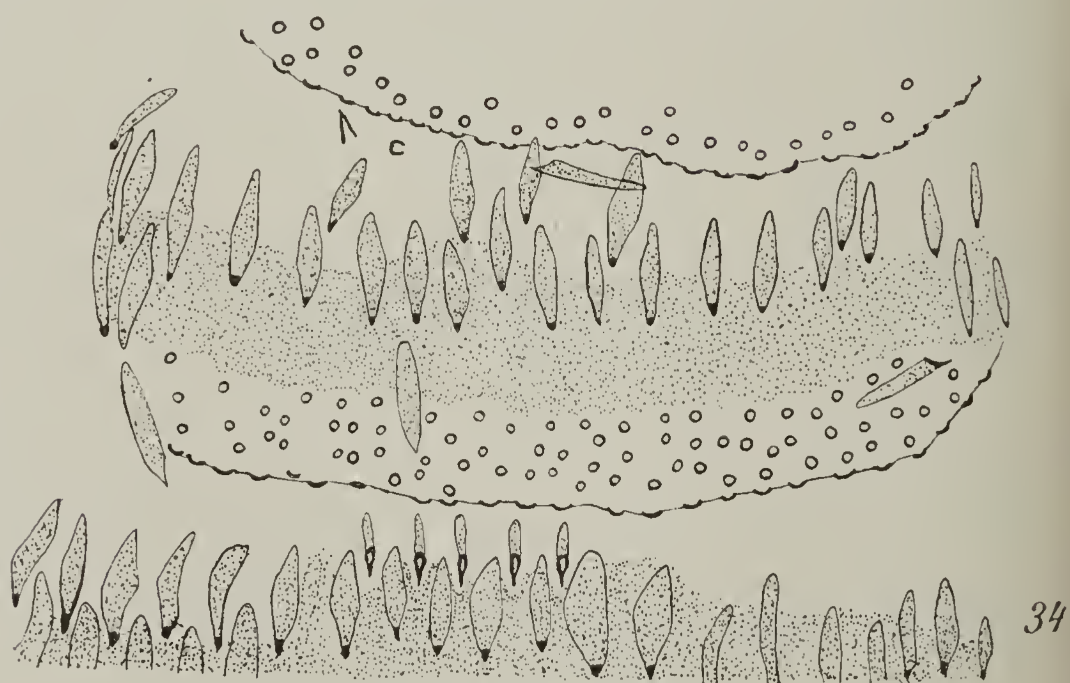
[1]) l. c. p. 176, 77, 101, 110, 125.

a

b

32



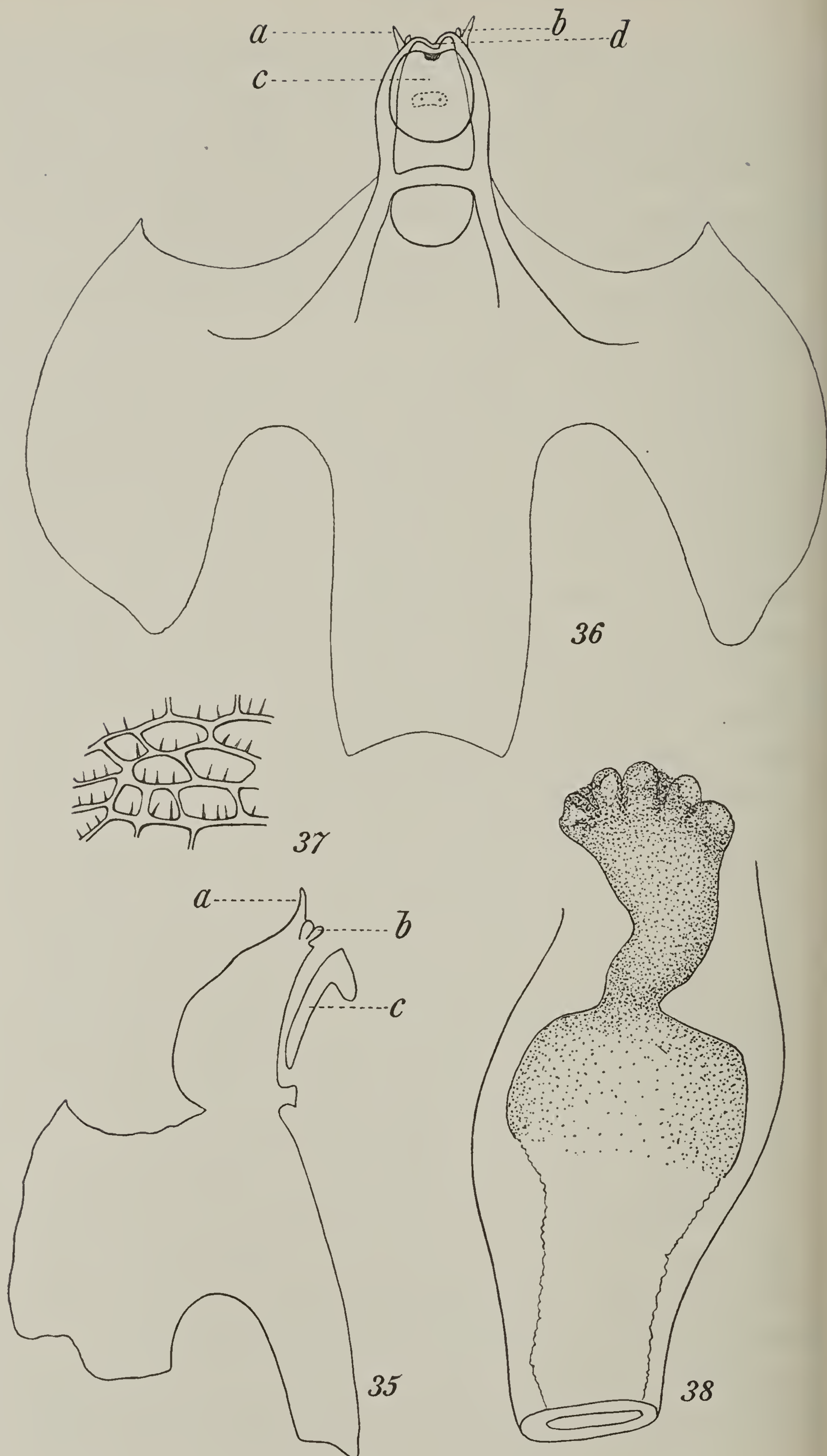


Digonochæta setipennis Fall. Fig. 32. Tragt med Larvehud af en Larve i 1ste Stad. *a*. Hud af Ørentvisten, *b*. Digonochæta-Larvens Svælgskelet. Fig, 33. 1. Stad. Svælgskelet. Fig. 34. Bagranden af den store Plade paa 3. Led, hele 4. Leds Plade og Forranden af 5. Leds Plade.

2det Stadium: Længde c. 3 mm. Huden besat med meget fine, spredt stillede Torne. Svælgskelettet (Fig. 35) af en ganske ejendommelig reduceret Bygning, som jeg hidtil ikke har truffet hos andre Tachin-Larver; da det ikke synes at afvige væsentlig fra 3die Stadium, henviser jeg til Beskrivelsen af dette, af hvilket jeg har haft betydelig bedre Materiale end af 2det Stadium.

Bagspiraklernes atrium cylindrisk, svagt opsvumlet i Spidsen, med to dybt adskilte Knopper.

3die Stadium: Længde 7—9 mm. Huden glat og tornløs. Svælgskelettet (Fig. 36) lyst, brunligt, Kitinen af en ejendommelig traadet Struktur. Svælgskelettet bestaar fortil af to brede segldannede Plader (Fig. 36), der i den nedre Del er stærkere kitiniserede end i den øvre. Pladerne ender fortil med 3 Udvækster, en øvre, spids og udadrettet og to nedre og kortere, af hvilke den ene ved en Bøjle, der passerer over Svælget, forbindes med den tilsvarende Udvækst paa den anden Halvdel af Svælgskelettet. Ved Roden af Pladerne findes den sædvanlige Forbindelsesbro mellem Svælgskelettets to Halvdele, og bag ved denne Bro udbreder Svælgskelettet sig i de almindelige nedre og øvre Svælgplader, der ikke i Formen afviger fra det sædvanlige hos Tachinlarverne. Under Svælgskelettet findes i Svælgets Bund en Plade (Fig. 36), hvortil intet tilsvarende findes hos andre Tachinlarver; Pladen er bred og dækker omtrent Rummet fra Forbindelsesbøjlen fortil til Forbindelsesbroen. Forranden er tilbagebøjet hos Larven i 2det Stadium i større Udstrækning end i 3die. Pladen er paa Overfladen forsynet med et Netværk af ophøjede Lister (Fig. 37), der bærer meget spidse udadrettede Tænder. Dette Svælgskelet er i høj Grad afvigende fra andre Tachinlarvers, dels ved at Sondringen mellem Mundkroge og forreste og bageste Svælgplader ganske er forsvundet, dels ved Tilstedeværelse af den forreste Forbindelse mellem Spiraklerne og af den store Plade i Svælgets Bund, der vel fungerer som et Slags Siapparat. At Svælgskelettets Reduction skulde være paavirket af Ejendommeligheder hos Værten, er ikke rimeligt, da jeg kender en anden, endnu



Digonochæta setipennis Fall.

Fig. 35. 2. Stad. Svælgskelet, a. de øverste Tappe paa Svælgskelettets Spids, b. de nederste, c. den store Plade under Svælgskelettet. Fig. 36. 3. Stad. Svælgskelet set fra neden, a. b. c. som i Fig. 35, d. Forbindelsesbøjlen. Fig. 37. En Del af den store Plade. Fig. 38. 3. Stad. Forspirakel.

ikke bestemt, ligeledes i Ørentviste levende Snyltefluelarve, hvis Svælgskelet har Tachinlarvernes almindelige Form[1]).

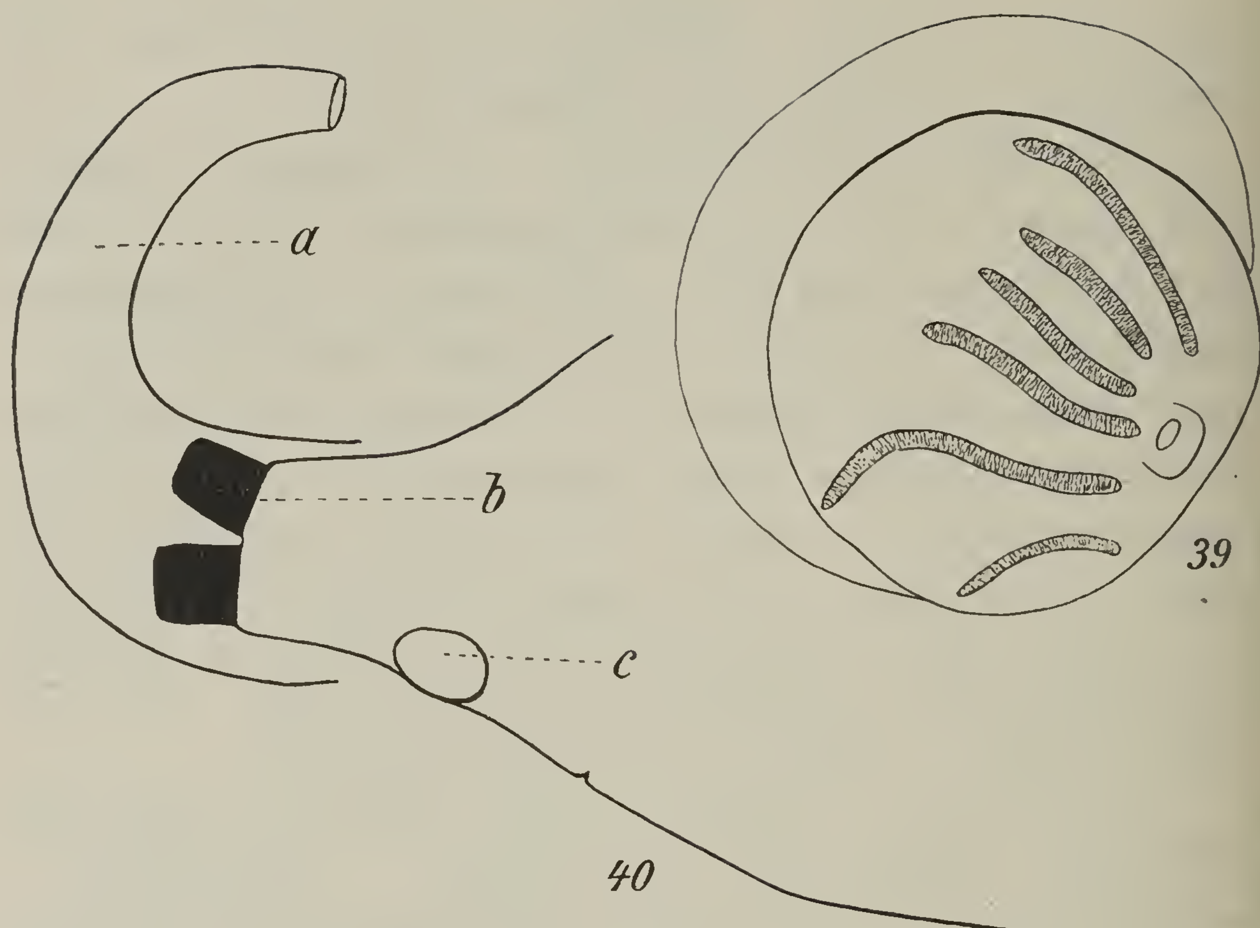
Forspiraklerne (Fig. 38) sidder i en dyb Indsænkning i Huden: Atriet bestaar fortil af et omvendt kegledannet Parti, der løber ud i et varierende Antal (5—8) korte Knopper; det kegledannede Parti fortsættes i et kort og bredt, udvidet, cylindrisk Parti af lysere Farve, der atter fortsættes i et blødhudet Stykke, der naar ned til Indsænkningens Bund. Bagspiraklerne er særdeles fremtrædende. Rammen er udviklet til et cylindrisk, kulsort Rør, der staar ret op fra Huden, og som affllades og omslutter Aandefelterne paa Spidsen; disse er langstrakte, snart svagt bøjede, snart lige, meget varierende i Længde, Form og Antal (Fig. 39).

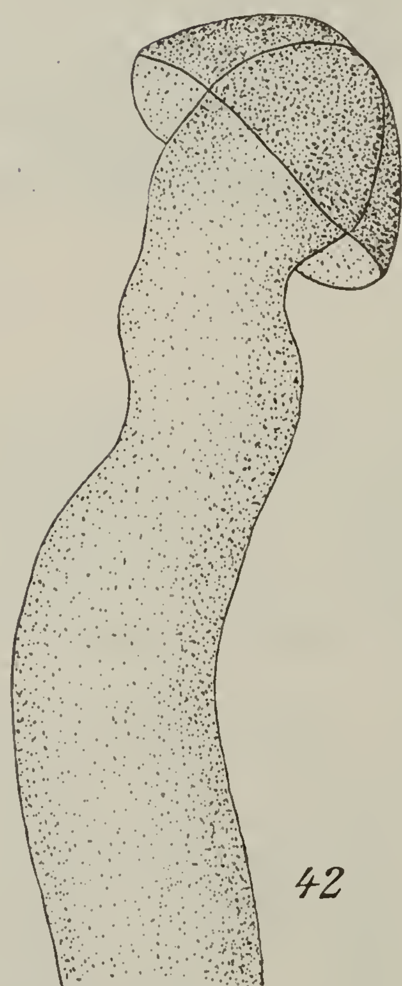
Tøndepuppen: Længde 4—5 mm. Bredde c. $2^1/_2$ mm. Ægformet-oval, stærkere hvælvet paa Rygsiden — særlig bagtil — end paa Bugsiden. Sort glinsende, Segmentgrænserne kendetegnede ved Rækker af smaa lave Knopper. Forspiraklerne svagt fremstaaende. Bagspiraklerne stærkt fremstaaende som to store, glinsende sorte, ved Roden sammenstødende, divergerende Tappe. Gattet ikke fremstaaende. De ydre Puppespirakler synlige som et Par meget utydelige, smaa Knopper.

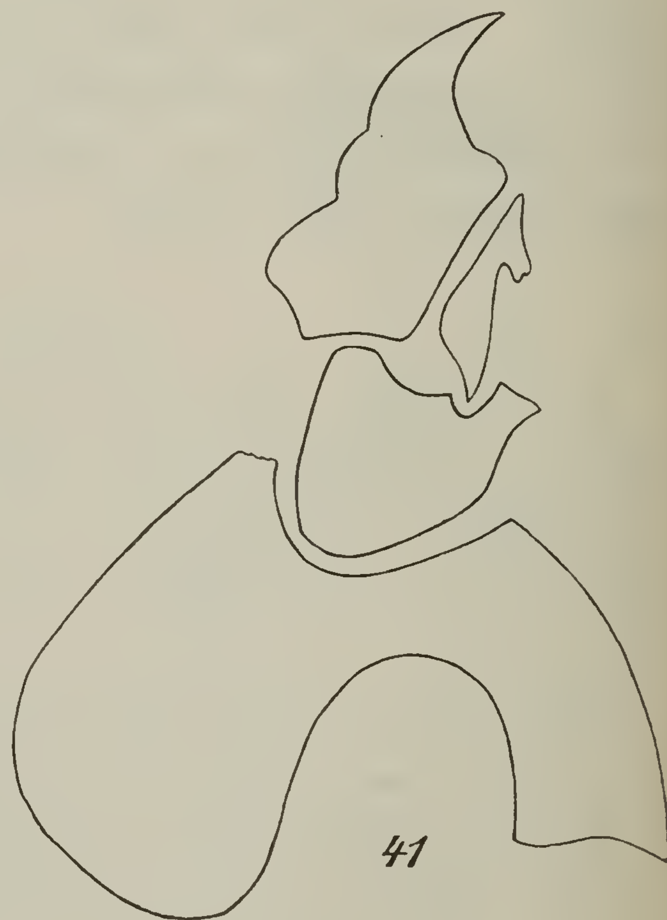
Biologi.

Jeg har fundet *Digonochæta setipennis* snyltende i Ørentviste (*Forficula auricularia* L.); den er dog ogsaa her i Landet klækket af en ubestemt Sommerfuglelarve. Jeg antager, at den hos Ørentviste kun lever hos Imagines, idet mindste fandt jeg den ikke

[1]) Jeg kender kun 3die Stadium af denne Larve. Dens Bagspirakel kan ikke adskilles fra *Digonochæta*-Larvernes, men den afviger iøvrigt fra denne i følgende Punkter: Svælgskelettet (Fig. 41) tilhører Tachinlarvernes sædvanlige Type, (dog findes en meget fremtrædende Plade under Mundkrogenes Rod), Forspiraklernes atrium bestaar af et langstrakt cylindrisk Rør, hvis Spids ved Udmundingen i Huden omsluttes af en rund, tagformet Ramme (Fig. 42). Huden er — ialt Fald paa de bageste Leds Rande — besat med Torne. Habituelt kan Larven kendes fra *Digonochæta*-Larven ved, at Bagenden er stærkt tilspidset og stukket længere ind i Tragten (Fig. 40).







Digonochæta setipennis Fall. Fig. 39. 3. Stad. Spidsen af et Bagspirakel. *Ubestemt Snylter hos Ørentviste* 3. Stad. Fig. 40. Bagenden af Larven. *a.* Tragten, *b.* Bagspiraklerne, *c.* Anus. Fig. 41. 3. Stad. Svælgskelet. Fig. 42. 3. Stad. Forspirakel.

hos flere hundrede Ørentvistelarver, som jeg i 1910 indsamlede ved Hald paa Steder, hvor tomme Tøndepupper viste, at Snyltefluen var almindelig.

Paa et Sted i Fortunens Indelukke, hvor Lærer P. Kryger gennem flere Aar havde fundet *Digonochæta*-Pupper, indsamledes i September 1909 og i August og September 1912 under løssiddende Bark paa Hegnspæle et Antal *Forficula auricularia* L.; af disse viste ikke faa sig at indeholde Snyltefluers Larver.

Ligesom Pantel har jeg fundet Snylternes Indboringshuller i Ledhuden og altid tæt op til Randen af en Kitinskinne, aldeles overvejende paa Thorax, i et enkelt Tilfælde i Bagkropspidsen, og som den nævnte Forfatter har jeg set 1ste Stadiums Larvehude liggende fuldt udstrakte inde i den fra Indboringshullet udgaaende Tragt; derimod har jeg fundet 2det Stadiums Hud liggende sammenkrøllet inde i den Fedtsæk, der omgiver Larven. Udboringen sker — ialt Fald i Reglen — gennem Ørentvistens Bagkropspids.

Snyltelarverne er fuldvoksne i Oktober; efter Udboringen af Værten forpupper de sig straks paa det Sted, hvor de har forladt Værten, under Bark, i en Larvegang i Træ o. l. Steder. Enkelte Fluer kommer frem samme Efteraar, men de fleste overvintrer som Pupper og udvikles først næste Foraar. Af 5 Pupper, der var fundne i Oktober 1909, kom 1 Flue frem i samme Maaned, de 4 andre udvikledes først d. 12., 13. og 24. April 1910.

Summary

Biological observations.

Phryxe vulgaris Fll.

This species is double-brooded; the maggots of the first generation were found in the caterpillars af *Cheimatobia brumata* L., *Hibernia defoliaria* L. and *Drybota protea* Bhk., those of the

second generation in *Orgyia antiqva* L., *Eremobia ochroleuca* Esp. and *Eupithecia innotata* Hfn. On the skin of the *Drybota protea* Bhk., taken on the $^{9}/_{6}$, were seen little dark spots indicating the way, through which the parasites had penetrated into the caterpillars; few days after ($^{13}/_{6}$—$^{14}/_{6}$) larger spots appeared around some of the spiracles, and by opening the caterpillar I found the *Phryxe*-maggots fixed to the trachea originating from the spiracle. The parasites were full-grown on $^{16}/_{6}$ and the flies emerged the $^{30}/_{6}$. I found no eggs or traces of such on the hosts. The maggots which develop in the *Eupithecia* caterpillars are fullgrown in October, and the puparia hibernate; in these caterpillars was only found a single parasite, in those of *Dryobota* up to four.

Tachina larvarum L.

This and the other *Tachina* species here mentioned have been found parasitic on caterpillars and belong to Pantel's I group.

In the summer af 1911 460 cocoons of *Zygæna filipendulæ* were collected in a little wood in the vicinity of Copenhagen, where this species had occurred in abundance some years ago, but where it is now strongly decreasing in number. From these cocoons 116 *Zygæna* emerged, 225 *T. larvarum* L., 35 Ichneumon flies and 54 were empty. From 1 to 22 eggs were deposited on a single caterpillar, especially on the anterior part of the body. The highest number of Tachinas bred from a single cocoon was 4, thus a great number of the eggs or maggots must have perished during the development. In order to obtain a closer examination of this feature I opened 150 cocoons after the hatching of the Tachinas and counted the number of eggs on the skin of the hosts and the number of puparia lying in the cocoons. The table p. 227 shows the results: From nearly two thirds of the hosts only one parasite was hatched, in spite of the fact that among these hosts were specimens on which up to 16 eggs had been deposited; from a fifth part two flies emerged, from eleven cocoons three and only

from a single host, which bore 13 eggs, four parasites. In addition to these Tachinas also 6 Ichneumon flies were bred from caterpillars with *Tachina*-eggs. In all the 150 caterpillars bore 767 eggs, and the number of bred flies was 144, so that only about a fourth of the parasites succeeded in accomplishing their development. The size of the flies was of course very variable, differing between 5 mm. and 13 mm.; in the cases where several flies emerged from the same host, their size was not equally reduced, one or two of them not differing in size from that of flies which had developed solitary, the remainder being undersized. Allmost all of the maggots pupated within the skin of the dead hosts.

Tachina impotens Rond.

The larva is parasitic in the caterpillars of *Orgyia antiqva* L., which were found on a thorn-hedge in the neighbourhood of Copenhagen. The eggs were deposited only on the fullgrown caterpillars and with few exceptions on the underside of the body, in the furrows between the thoracic segments or between the head and the first segment. The fly was not common, and the caterpillars were nearly all provided with only a single egg each — one only being found with two. Consequent to the maturity of the caterpillars a great number of them pupated before the parasite had penetrated into their body and thus escaped being killed by the maggots; owing to this fact many of them, into which the *Tachina* maggots had penetrated, pupated, before they were killed. Of 34 caterpillars 21 pupated before the *Tachina*-eggs were mature, and 13 after the penetration; of the lastnamed 9 pupated before they were killed and only 4 were killed by the parasites before the pupation. The fullgrown *Tachina*-maggot leaves the remains before pupating and pupates in the hosts cocoon. The infested caterpillars were collected in the months of August—September, and all the flies emerged in October.

Tachina macrocera R. D.

(*T. nitidiventris* Zett.).

This fly has been bred from caterpillars of *Dasychira groenlandica* Woche in East Greenland. In Denmark I have meet with the species in June at Tisvilde, where it oviposited on fullgrown caterpillars of *Malacosoma castrensis* L.; all the hosts pupated before they were killed by the parasites, which pupated in the cocoon outside the pupal shell of the hosts.

Tachina vidua Meig.

Bred from a caterpillar of *Macrothylacia rubi* L.

Digonochæta setipennis Fall.

Bred from an undetermined caterpillar and in numbers from fullgrown earwigs (*Forficula auricularia* L.). In September the maggots are in the 3rd stage and are found with the posterior end attached to a chitinous funnel originating from a hole in the skin between the sclerites, through which the young larva has penetrated into the earwig. The hole is in most cases found on the thorax of the earwig. In the funnel the cast larval skin of the first stage of the *Digonochæta* larva is lying fully extended. Before the pupation the parasite leaves the host. The maggots are fullgrown in October and the flies emerge either in the same autumn or in April of the next year.

Explanation of the figures.

Phryxe vulgaris Fll.

Fig. 1.	1.	Stage.	Pharyngeal skeleton.
— 2.	2.	—	— —
— 3.	3.	—	Anterior spiracle.
— 4.	-	—	Pharyngeal skeleton.
— 5.	-	—	Anterior spiracle.
— 6.	-	—	Posterior spiracles.

Fig. 7. Skin of a larva of *Drybota protea*, with a hole (*a*) through which the *Phryxe*-larva has penetrated, and spiracles (*b*) surrounded with dark marks indicating that the *Drybota*-larva is infested with *Phryxe vulgaris*.

Tachina larvarum L.

Fig. 8. Egg. a appendix.
— 9. 1. Stage. Posterior end. a chitinous sticks.
— 10. — Skin from the 12. Segment with spines and two sticks.
— 11. — Pharyngeal skeleton.
— 12. — Apex of the pharyngeal skeleton.
— 13. 2. — Pharyngeal skeleton.
— 14. 3. — — —
— 15. — Anterior spiracle.
— 16. — The end of an anterior spiracle, sideview.
— 17. — Posterior spiracle.
— 18. Puparium. Posterior spiracles and anal papilla.

Tachina impotens Rond.

Fig. 19. 1. Stage. Posterior end.
— 20. — Pharyngeal skeleton.
— 21. 2. — — —
— 22. 3. — — —
— 23. — Anterior spiracle.
— 24. — Posterior spiracle.

Tachina macrocera Rob. Dew.

Fig. 25. 1. Stage. Pharyngeal skeleton.
— 26. 2. — — —
— 27. 3. — — —
— 28. — Anterior spiracle.
— 29. — Posterior spiracle.
— 30. Puparium. Posterior spiracles and anal papilla.

Tachina vidua Meig.

Fig. 31. 3. Stage. Posterior spiracle.

Digonochæta setipennis Fll.

Fig. 32. Funnel, originating from the skin of an earwig, with the cast larval skin of a *Digonochæta*-larva in 1. stage. *a*. a part of the skin of the earwig. *b*. pharyngeal skeleton of the *Digonochæta*-larva.

Fig. 33. 1. Stage. Pharyngeal skeleton.
— 34. — A part of the skin.
— 35. 2. — Pharyngeal skeleton. *a.* the upper tooth, *b.* the lower tooth of the apex of the skeleton, *c.* a great plate under the skeleton.
— 36. 3. Stage. Pharyngeal skeleton, from the underside: *a. b. c.* as in fig. 35, *d.* the connection between the ends of the plates.
— 37. 3. stage. A part of the plates under the pharyngeal skeleton.
— 38. — Anterior spiracle.
— 39. — End of a posterior spiracle.

Undetermined larva in earwigs.

Fig. 40. 3. Stage. Posterior end lying in the funnel (*a*). *b.* posterior spiracles. *c.* anus.
— 41. — Pharyngeal skeleton.
— 42. — Anterior spiracle.

10.—11.—1912.

Systematic Studies on the Sertulariidae.

By

G. M. R. Levinsen.

(With Plates IV—V).

In 1893 I published a paper on the Medusae, Ctenophores and Hydroids from the west-coast of Greenland, in which I made an attempt to introduce a more natural arrangement of certain families of Hydroids, advocating the view, that in the limitation of the genera the characters found in the single individuals of the colony, and especially in the trophosomes, ought to be preferred to such characters, which might be derived from their different arrangement on the stems and branches of the colony. As to the *Sertulariidae* I proposed a limitation of the genera on the basis of the diversities presented by the opercular apparatus, and by the margin of the hydrotheca, the form of which is always contingent upon the structure of the operculum. While a number of authors (Marktanner-Turneretscher, Schydlowsky, Broch, Sæmundsson and Kramp) have followed my view, it has been attacked by others, but before I undertake to answer the objections raised against it, I shall set forth some general remarks on the systematic value of the colonial form or the form of growth.

In all aggregate animals we have to discern between two categories of characters of very different systematic value, namely those presented by the single individuals (the zooidal ch.) and those derived from the different ways in which they may be arranged in the colony (the zoarial or colonial ch.). In the first attempts at a systematic arrangement of aggregate animals the latter characters

have of course always been the first used by the authors, who at that point of time had only a very imperfect knowledge of the single individuals composing the colony or none at all. The pictures presented by the different colonial forms captivated the eye, and through this mastered the arranging thought. Such an attempt is Ellis' renowned work on the Corallines[1]) under which common name he classes not only Hydroid polyps and *Bryozoa*, but also the articulate chalk-algae, while the first step to dissolve the systematic connection between the two first named divisions was made in 1828 by Milne-Edwards and Audouin[2]) who pointed out that *Flustra* in opposition to the polyps possesses an intestinal tube provided with two apertures, and in consequence of this discovery proposed the institution of a separate family comprising the *Flustrae* and relied forms. But the belief in the systematic importance of the outer habitus and the mode of growth is not so easily conquered, and ten years later Milne-Edwards[3]) says about the result of this proposal: „Ce premier essai d'une classification naturelle des Polypes fondée sur l'organisation de ces animaux ne fut pas adopté par les zoologistes. M. Cuvier, dans la seconde édition du règne animal, publiée en 1830, continua à distribuer ces zoophytes d'apres la conformation générale de leur Polypier et rangea encore les Flustres entre les Sertulaires et les Corallines tandis que les Eschares dont la structure diffère à peine de celle de ces Flustres se trouvaient relegués dans la tribu des Lithophytes à la suite des Coraux et des Madrépores." After Milne-Edwards had extended his investigations also into the anatomy of the strongly calcified cheilostomatous forms (the *Escharae*), and other naturalists as delle Chiaje, Ehrenberg and Lister had arrived at the same results, the *Bryozoa* were gradually separated from the Hydroid polypes, but still in the second edition of Lamarck's Histoire naturelle des animaux sans vertèbres (1836)

[1]) 18.
[2]) 6, p. 14.
[3]) 41, p. 16.

we find for inst. *Thujaria thuja* and *Thuj. lonchitis* referred to the genus *Cellaria* and placed between *Cellaria (Crisia) eburnea* and *Cell. (Bicellariella) ciliata.*

While the older Bryozoan systems are based entirely on diversities in the form of the colony Smitt and Hincks lay the chief stress on the form and structure of the zooids, and this view must at present be regarded as the dominant. As, however, in the Hydroids most authors as systematic characters still prefer zoarial diversities to zooidal, I think it might be of use in general to examine the question how great systematic importance may be ascribed to the form of the colony, and I shall first give some quotations from the few authors who have treated this question with respect to the *Bryozoa.* The first quotation is from the late Th. Hincks[1]) who has played a chief part in the working out of a more natural Bryozoan system, and has, besides, done such excellent work also in the Hydroid polyps. After having spoken about the slight help, which the polypide, and the avicularia give us in systematic regard, he continues: "There remain the characters of the cell[2]) itself and the habit of growth. It can hardly be deemed doubtful which of them should have the precedence in a natural system; we may go very much further, indeed, and say that in such a system the latter must hold a very secondary and subordinate place. The essential structure of the cell[2]), as one of the primary zooidal[3]) forms, must certainly be accounted the most important point both in itself and as a clue to relationship. The mere habit is, so to speak, a superinduced condition, which may be different in the most nearly related and similar in the most divergent forms, and groups based on it,

[1]) 23, Introd., p. CXXVIII.

[2]) By the "cell" is here meant the zooecium.

[3]) According to the old cystid theory the zooecium and the nutritive apparatus (the polypide) were both regarded as individuals (zooids). The above citation from Hincks has also been used in my work on the cheilostomatous bryozoa (35, p. 68), but by a mistake the word "zooidal" has been replaced by "zooecial".

instead of fitting in with natural affinities, are found to traverse them at all points." In 1884 the late G. Busk[1]) who has rendered so great services to the study of the *Bryozoa*, published his report on the cheilostomatous *Bryozoa* from the Challenger expedition. The author, who had hitherto laid the chief stress on the colonial characters, strives to a certain degree to accomodate himself to the systematic views of Smitt and Hincks, the correctness of which he partially acknowledges, but he thinks, however, that these authors have underestimated the colonial characters. The result of this mediation is, as he himself acknowledges, far from being satisfactory. I shall here quote the following part of his introduction: "As to the scheme of classification followed in this Report, ... it is scarcely necessary to remark that it has no pretension to be regarded as more than a convenient and to a considerable degree artificial arrangement, ... For allthough many of the family groups may in some measure be regarded as expressing natural alliances, many of them, ... can only be considered as artificial, and as such they must perhaps remain until we are better acquainted with the true significance of the minute parts or organs upon which the distinctive characters are in many cases founded. Nor at present, perhaps, are we in a position fully to appreciate the relative value of the zooecial as compared with the zooarial characters, which of late it appears to be the fashion, unduly as I think, to depreciate; the individuality of the zoarium as a continuous whole or entity having been too much overlooked in the almost exclusive consideration of its component parts or segments."

A somewhat similar standpoint has been taken up by Rev. A. M. Norman[2]), who has published a number of valuable papers on the *Bryozoa*. He expresses himself as follows: "It has been argued by recent writers that the form which a colony of a polyzoon belonging to the *Cheilostomata* assumes is of no moment in generic

---

1) 14 a.

2) 43. p. 122.

character. *Electra pilosa* lends strong support to this view. Yet it is a view nevertheless in which I am not prepared in all cases to acquiesce. The zooecial characters are unquestionably all important, but no lasting classification can be based on any part of the zooecium . . . . . Why also in all instances is the ultimate growth and form of the zoarium to be excluded from generic character among certain families of the *Cheilostomata*, and at the same time to be recognized among the *Cyclostomata* and *Ctenostomata*, and even other groups of the *Cheilostomata*? This is surely scarcely consistent. In some instances, as for example in *Electra pilosa*, the form of the colony is of no generic and specific value, but in other cases it may be and, I believe, is."

In the systematic arrangement of most families of Hydroids the chief stress has not as in the earlier Bryozoan system been laid on the colonial form, but partly on the structure of the zooids partly on the different mode of reproduction, and the differences of opinion have arisen mostly from the question how great systematic importance ougth to be ascribed to the latter. The reason hereof is partly, that the zooids which are much larger and therefore much easier to examine than those of the *Bryozoa*, present a number of easily recognisable characters, f. inst. in the different form and arrangement of their tentacles, and in the different form of their proboscis and hydrothecae, partly, that the colonial form in most families does not present such differences which might tempt a systematist to the institution of genera. Such are on the contrary to be found in the *Sertulariidae*, in which the mode of arrangement of the hydrothecae together with the mode of branching is subject to very great variation, and, therefore, to a great extent has been used by the systematists. As soon as the operculum was detected and used as a systematic character there began a discussion about its systematic significance which still continues.

The first author who recognizes the systematic importance of this structure was Hincks[1]). While Grey had characterized

[1]) 22.

Sertularella by the strictly alternate position of its hydrothecae, Hincks lays the chief stress on the structure of the latter which are provided with 3—4 marginal teeth and with a similar number of opercular valves. While he has found no operculum in *Sertularia* and *Hydrallmania*, and in one of the two *Thujaria*-species named in his work, he characterizes *Diphasia* by the presence of an inner (adcauline) operculum, but as he has not seen that a quite similar operculum is also present in *Abietinaria abietina* and *Ab. filicula* he refers them to *Sertularia*. In the diagnosis of the different genera the author also uses the form of the colony and the structure of the gonothecae, but he expressly emphasizes that the whole arrangement must only be regarded as provisional:[1]) "Without the examination of a much larger number of foreign species, the genera of this family cannot be defined with certainty and precision; and the present grouping must be accepted as to some extent, provisional".

Professor G. J. Allman, who has published so many valuable works on the Hydroids, in opposition to Hincks has great confidence in the systematic importance of the colonial characters, and in one of his papers[2]) he even institutes a new family *Thujariidae*, solely based on the mode of division of the hydrocaulus into internodes. In his report on the Hydroids from the Challenger expedition he unites *Sertularella* with *Sertularia* as he has found an operculum in some species of the latter genus, and evidently cannot imagine that a generic difference might be expressed through the different form and position of something so delicate and perishable as the operculum, about the systematic significance of which he says[3]): "The valves in all these cases are so thin and perishable that it is only in recent or exceptionally well preserved specimens we can hope to meet with them, a fact which in itself deprives the distinctions, derived from them of that practical value

[1]) 22, pag. 260.
[2]) 2, pag. 267.
[3]) 5, pag. 51.

which ought if possible to be found in all well-selected systematic characters."

In my paper on the Greenland Hydroids I say about the colonial characters[1]: "A zoological system based on that kind of characters may be compared to a botanical in which the chief stress was laid on the inflorescences and not on the structure of the flowers. In both cases the genus would contain a number of heterogeneous species. It can hardly be deemed doubtful, that constant differences in the structure of the single individuals, in question of the hydrothecae or hydranths, ought to be preferred as systematic characters, and that colonial characters ought only to be used when structural diversities were not to be found."

When we compare the two categories of characters, the colonial and the zooidal, with respect to the question, which of them give us the most valuable information about the beings concerned, there can be no doubt that it is the latter which do so, as they inform us both about the structure of these beings and about the different modifications which this structure may present. The colonial characters only inform us of the form of the colony, and the different arrangement of the zooids, and in opposition to the combination of characters upon which the systematic position of the species is contingent the arrangement of the zooids may often be quite the same in species belonging to different classes. In the Bryozoan species *Gemellaria loricata* for inst. the colony as in many *Sertularia*-species is composed of pairs of zooids, each of which by a constriction is divided from the next one. If the colonial characters might be regarded as a true, though imperfect, expression of the natural affinity, it could only be on the supposition, that there always existed so close a relation between structure and colonial form that differences in the latter not only corresponded to a difference in class, but also to differences of order, family and genus. Everybody knows that this is not the case. In the vegetable kingdom we may at the one

[1]) 32, pag. 184.

side find the same form of inflorescence in different classes, ordines etc., and at the other side different inflorescences in the same family or even genus. In the *Bryozoa* we find the same unstable relation between structure and colonial form, and a great number of species may even appear in two or more different modes of growth, and with different arrangement of the zooecia. The most interesting example we possess is *Membranipora (Electra) pilosa* L. which according to A. M. Norman[1]) appears in the Trondhjem Fjord in 10 different modes of growth, a number of which were earlier regarded as the chief character of certain genera. The author says about these forms: "We see enormous changes brought about apparently at the will of individuals, who, building colonies after the various fashions characteristic of a large number of genera ..... simulate the general forms of a *Membranipora*, a *Hippothoa*, a *Carbasea*, a *Flustra*, a *Cellaria*, a *Gemellaria* and an *Eucratea*. Numerous other examples are named in my work on the Cheilostomatous Bryozoa[2]).

As to the Hydroids there is no reason to believe that the arrangement of the zooids should in this division be a more true expression of the natural affinity than in the *Bryozoa*. I shall at this place only bring forward as an example the artificial genus *Selaginopsis* (Allman) Mereschkowsky, as Schneider[3]) regards it as one of the best defined genera in the family *Sertulariidae*. Nutting[4]) has given a new definition of it, according to which it only contains species of the genera *Thujaria* and *Sertularia*, but he does not mention where he will put the polyserial species of the genus *Diphasia*. According to the original definition of

[1]) 43, p. .

[2]) 35, p. 70.

[3]) „Deutlich sich aus diesem Chaos abhebend standen nur *Pasythea* ... und *Hydrallmania* ..... Auch *Selaginopsis* Allman kann wegen vielreihiger Anordnung der Hydrotheken an der einzelnen Sympodien nicht zweifelhaft gestellt erscheinen, obgleich Levinsen sie auf drei seiner Gattungen, *Sertularia*, *Thujaria* und *Diphasia* auftheilt (54, p. 521).

[4]) 44, p. 127.

the genus, which is followed by most authors, *Selaginopsis* is only based on the character, that the hydrothecae are arranged in more than two longitudinal series, and if an author were to institute a new genus for inst. for those species of the bryozoan genus *Caberea*, in which the zooecia present a similar arrangement, it would certainly be rejected as based on too feeble a foundation, but it would nevertheless possess this advantage over *Selaginopsis*, that its species would agree in all essential respects. Most species of the latter "genus" belong to *Thujaria*, but three must be referred to *Sertularia*, namely *Sel. mirabilis* Verr. (= *Sel. Hincksi* Mer.), *Sel. ochotensis* Mer. and *Sel. (Pericladum) bidentata* (Allm.)[1], and two to *Diphasia*, namely *D. fusca* (Johnst.) (= *Thujaria salicornia* Allm.) and *D. Wandeli* Lev. Perhaps the same is the case with *Sel. Allmani* Norman[2]) (= *Sel. fusca* Allm.) Also *Sertularella* is represented within *Selaginopsis*, namely by *Sert. (Dictyocladium) flabellum* Nutt. and *Sert. (Dictyocladium) reticulatum* Krp., which both satisfy the claims put upon the species of this "genus", their hydrothecae being arranged in four longitudinal series, but they have by Allman[3]) been placed into another artificial genus, *Dictyocladium*, which differs from *Selaginopsis* therein that the branches are anastomosing. While the hydrothecae of all the species hitherto named are provided with opercula, no opercula are present in a number of other polyserial species, three of which have been referred to *Dictyocladium*, namely *D. dichotomum* Allm., *D. (Selaginopsis* Jäd.*) affine* (Jäd.[4]) and *D.* (*Selaginopsis* Jäd.) *dichotomum* (Jäd.[5]), and the same is the case with *Selaginopsis pachyclada* Jäd.[6]) and with a number of species referred to the artificial genus *Staurotheca* Allm. Allman[3]) characterized the latter genus by the possession of opposite hydrothecae which are arranged in

[1]) 2, p. 273.
[2]) 42.
[3]) 5.
[4]) 27 a, p. 32 and 59, p. 331.
[5]) 26 a, and 59, p. 332.
[6]) 27 a, p. 33.

decussating pairs, but Ritchie[1] has enlarged it to also include species with more than four longitudinal series of hydrothecae, characterizing it by the arrangement of the hydrothecae in alternate transverse series, each containing two or three hydrothecae; but a somewhat similar arrangement is also found in a number of *Selaginopsis*-species and according to Broch[2] we not rarely find in *Sel. mirabilis* four longitudinal series of hydrothecae in the place of six, and in that case the hydrothecae are, as in *Staurotheca dichotoma*, arranged in decussating pairs.

Even if all the species referred to *Selaginopsis* possessed a special form of operculum not found in any other genus, I should only regard the polyserial arrangement of the hydrothecae as a systematic character of lower rank, but it is evident from the above enumeration of species that there is not the slightest connection between this arrangement and the form of the operculum, and the former is as a rule not even constant within the colony, as in most species the hydrothecae are biserial in the stem, and besides, there has been found a number of species belonging to *Diphasia*, *Thujaria* and *Sertularia*, which present both biserial and triserial hydrothecae either in the same or in different branches, and sometimes in different colonies. *Diphasia Wandeli*, in the original specimen of which all the branches have three series of hydrothecae, is nearly related to *D. fallax*, and is perhaps only to be regarded as a variety of the latter species. Sæmundsson[3] refers to *D. Wandeli* four colonies, three of which have only biserial hydrothecae while in the fourth, which possesses 17 pairs of branches, two at the one side and six at the other have only biserial hydrothecae in their proximal portion and triserial in the rest of their length. Broch[4] has described a *Thujaria*, to which he has given no name as he is not sure of its identity. In the

---

1) 50, p. 538.
2) 13, p. 173.
3) 56, p. 97.
4) 13, p. 177.

proximal part of all the branches the hydrothecae are arranged in three longitudinal series, and in one of them this arrangement is continued through its whole length while in the others the rest of the hydrothecae are biserial. In another *Thujaria*-species, described by Torrey[1]) under the name of *Sertularia incongrua* the branches in their proximal portion possess two series of hydrothecae, and usually three series in their distal half. Nutting refers this species to *Selaginopsis triserialis* Mer.; but according to Mereschkowsky the triserial arrangement of the hydrothecae is in the latter species constant through the whole colony. Lastly I shall mention that Bale[2]) in a variety of *Sertularia unguiculata* Busk has found in some of the pinnae "a third series of hydrothecae, running for some distance along the front of the first internode."

The fact that there is no constant relation between the structure of the zooids and the colonial form, or to express it in another way, that they are incommensurable values defined by different laws, must have the logical sequence that one of them cannot be substituted for the other, and, therefore, a genus ought never to be instituted solely on the base of a difference in the colonial form, when otherwise the zooids present distinct structural diversities. When that is not the case, as in the great plurality of the cyclostomatous *Bryozoa*, we have of course only the colonial form to rely upon. To regard the colonial characters as the true generic characters and the zooidal characters only as specific characters, as some authors have done, is to turn the systematic arrangement upside down. —

In 1897 Dr. C. Schneider[3]) published a paper on the Hydroid polyps from Rovigno[3]), in which, besides, he sets forth a number of systematic remarks, of which we shall here only mention those referring to the *Sertulariidae*. I may give here

[1]) 57, p. 69.
[2]) 7, p. 76.
[3]) 54.

a critical representation of his Sertularian system, and in order to make it more coherent and easier to read, I shall give most of the quotations, on which it is based, as notes. Schneider at first states[1]) that my system, which is based on diversities in the opercular apparatus, cannot in any way stand together with that of the former authors who divide the genera mainly according to the arrangement of the hydrothecae in the branches[2]). He admits that at first sight it looks seductive[3]), but though he does not seem to have subjected it to a real test, he comes to the result that the older authors are right in the main, and that such a great systematic importance cannot be ascribed to the operculum in opposition to the characters formerly used[4]). — Schneider gives three reasons why he has not been able to admit my systematic characters. The first is connected with my assertion that there exists a certain harmony between the margin of the hydrotheca and the structure of the operculum, and that we, therefore, even in colonies which have lost their opercula, may be able from the structure of the former to draw a conclusion as to the character of the latter. Schneider thinks it possible, therefore, that a great deal of my statements are only based on this form of investigation[5]), in which he evidently has no confidence. However, I

---

1) „Levinsen begründet auf den Bau des Opercularapparats seine von der ältern durchaus abweichende Systematik. Es ist nothwendig, zu dieser sofort Stellung zu nehmen; denn, falls wir sie acceptiren müssen ist eine Besprechung der frühern systematischen Angaben überflüssig ja unmöglich" (p. 520).

2) „Die ältere Systematik hielt sich, wenigstens in der Hauptsache, an die Vertheilung der Hydrotheken an den Sympodien" (p. 521).

3) „Für den ersten Blick hat diese Eintheilung etwas Bestechendes" (p. 521).

4) „Indessen fragt es sich, ob wir der Deckelbeschaffenheit so hohe Bedeutung gegenüber den bis jetzt angenommenen Charakteren zuschreiben dürfen und ob letztere nicht doch wenigstens in den Hauptzügen zu Recht bestanden. Ich glaube nun, mich dieser letzteren Anschauung zuneigen zu müssen" (p. 520).

5) „Ueberhaupt mag Levinsen in den Auftheilungen wohl oft zu sehr der äusseren Beschaffenheit der Hydrothekenmündung, die meist doch nicht immer auf eine bestimmte Deckelbeschaffenheit schliessen lässt Rechnung getragen haben" (p. 522).

have not used it for any of the species treated of in my paper. Schneider's second reason is due to a misunderstandig, as he namely has got the impression, that I regard the operculum of *Sertularia* as an internal structure placed under the original roof of the hydrotheca, and he cannot understand such an operculum[1]), in which I quite agree with him. I cannot, however, understand in what manner Schneider has got this impression. He declares[2]) that he only knows my investigations from the partial translation which has been given by Markthanner-Turneretscher[3]), but in this the position of the operculum in *Sertularia* is mentioned in the following way: „Die Mündung der Hydrothek ist an der abcaulinen Seite mit einer tiefen Einbuchtung versehen, in welcher das Deckel befestigt ist", and in my paper I say quite the same in Danish as well as in Latin. After having set forth the last named objection Schneider says: „Diese Bedenken lassen mich vor der Hand davon absehen, Levinsen's Gattungskaraktere als gute anzuerkennen" after which he adds: „Damit sei ihnen indessen nicht jeder Werth überhaupt bestritten." Schneider does not explain what he means by this sentence, but it seems permissible to understand his words as meaning, that the characters named may be used as species-characters.

I think that the chief reason for Schneider's different systematic standpoint from mine must be sought for in our different mode of working. While I have endeavoured to divide the genera as strictly as possible, deferring the question as to their mutual relation, till a sufficient amount of knowledge has been secured, Schneider's chief aim has been to unite and to find — as fast as possible — the unity in the multiplicity. Therefore he does not like strictly defined genera which apparently protest against this unity, and, besides, he has no time to wait, until the great bulk of the hitherto described species have been examined as to

---

[1]) „Auf Grund dieser Erwägungen kann eigentlich von einem inneren Deckel nicht geredet werden" (p. 522).

[2]) 54, p. 511.

[3]) 37.

their opercula. The colonial form, in the systematic importance of which he implicitely believes, gives him in much shorter time a general view of the connection between all these forms, showing him that the different "groups" are mutually united by transitional forms, and that sharp contrasts do not exist at all. The following statement, however, seems to show that Schneider uses the term "transition" in a very singular manner[1]): „*Thujaria*, *Selaginopsis* and *Pasythea* sind durch Uebergänge vermittelt, wie schon daraus klar wird, dass Levinsen Vertreter jeder dieser drei Gruppen auf mehrere seiner Gattungen vertheilt." I cannot see the clearness of this argument. When I have shown that the species of the old genus *Selaginopsis* according to their opercular apparatus must be distributed into the genera *Thujaria*, *Sertularia* and *Diphasia*, and that other species provided with the same forms of opercula are contained within the frame of the old genus *Sertularia*, this fact does not prove, that *Selaginopsis* and *Sertularia* are connected by transitions, but only that they are artificial genera. On the other hand there are numerous transitions between the different colonial forms which have been used as generic characters, and Schneider, therefore, quite naturally comes to the result that all the *Sertulariidae* strictly speaking must be regarded as forming a single genus[1]). This he again divides into groups admitting at the same time that neither are they strictly divided. We shall later consider some of these groups. —

While Schneider originally declared that my opercular system was quite inconsistent with one based on the arrangement of the hydrothecae, he at other places sets forth quite contrary statements, according to which we should believe, that there is the most complete agreement between the colonial form and the structure of the operculum. Thus he says[2]). „Aber wenn wir die typischsten Formen der *Sertularidae* ansehen, scheint Hand in Hand mit besondern Deckelformen auch eine besondere Anordnung

---

1) 54, p. 522.
2) 54, p. 522.

der Theken zu gehen. Ein kleiner Ueberblick soll dass erweisen." Further he says[1]): „Aber ein Ueberblick über die ganze Gruppe lehrt den innigsten Zusammenhang aller oft anscheinend so heterogenen Formen unter einander; von einer Gruppe zur andern vermitteln Zwischenglieder, und diese Zwischenformen vermitteln auch hinsichtlich der Form und Anheftungsweise der Deckel." However, Schneider's apparently contradictory assertions might perhaps be explained in this way, that he has found my statements regarding the structure of the different opercula incorrect, and therefore has undertaken a new investigation with another result. He says that the large collection of Hydroids in the zoological museum of Vienna, which have been identified by Marktanner-Turneretscher has been at his disposal, and there might be reason to believe that by the aid of this collection he had tested the correctness of my investigation. But he does not seem to have done such a thing, and the above assertion is directly contradicted not only by my investigations, but also by the contents of his own groups.

The central point in Schneider's system is that he regards *Sertularella* as the genus from which all the other genera have developed, but he makes no attempt to solve that question which in this connection should be the most important, namely, in what manner the different forms of opercula might have been developed from the operculum of *Sertularella*. Driesch[2]) in the *Sertulariidae* discerns between two chief colonial types, the *Diphasia*-type with opposite and the *Sertularella*-type with alternate hydrothecae, and he has tried to show that the former type may be derived from the latter. From this starting point Schneider[3]) gives the following sketch of the development of the different „groups" from *Sertularella* by means of a moving together of the hydrothecae: „Es verschwinden zunächst eine Anzahl Gelenke aus Ursache der

---

[1]) 54, p. 521.
[2]) 17.
[3]) 54, p. 524.

grössern Annäherung der Hydranthen; das ergiebt den *Thujaria*- und den *Dynamena*-Typus, letzterer vielleicht zum Theil direct aus dem *Sertularella*-, zum Theil aus dem *Thujaria*-Typus ableitbar. Noch grössere Annäherung führt zur Entwicklung der *Pasythea*-Gruppe, zum Theil von *Thujaria*, zum Theil von *Dynamena* aus; ferner zur *Selaginopsis*- und zur *Hydrallmania*-Gruppe, beide von *Thujaria* aus." When Schneider lets the joints disappear in order to produce the *Dynamena*-type, he forgets that according to his own definition of this type it is characterized by the possession of a joint between each two pairs of hydrothecae.

Of the six groups into which Schneider divides the *Sertulariidae* we have already regarded *Selaginopsis*, and we shall later speak about *Pasythea* and *Hydrallmania* on mentioning the systematic arrangement proposed by Professor Nutting. At this place, therefore, we have only to mention the groups *Dynamena* and *Thujaria*.

Schneider characterizes the *Dynamena*-group in the following way: „Die Hydrotheken opponirt, zwischen jedem Paar ein Gelenk; ......; Mündung der Theca meist mit zwei vorgetäuschten (Levinsen) Zähnen, Deckel einfach. — Hierher gehören: *Diphasia rosacea* L., *attenuata* Hincks, *fallax* Johnston, *pinaster* Ell. et Sol., *tamarisca* L., *pinnata* Pallas., *Sertularia pumila* L., *gracilis* Hassall, *operculata* L.; *Sertularia bispinosa* Gray, *minima* Thompson, *macrocarpa* Bale." Of the species here named *Diphasia rosacea*, *D. attenuata*, *D. fallax*, *D. pinaster* and *D. pinnata* have no teeth and an adcauline opercular valve and belong to my genus *Diphasia*, while *D. tamarisca* must be referred to *Sertularella* as it possesses a tridentate hydrotheca and three opercular valves. *Sertularia pumila*, *S. gracilis* and *S. minima* belong to my genus *Sertularia*, as the bidentate hydrothecae possess an adcauline collar and an abcauline opercular valve, while *Sertularia opercularis*, *S. bispinosa* and *S. macrocarpa* must be referred to a new genus, *Odontotheca*.

The *Thujaria*-group is characterized as follows: „Die Hydrotheken mehr oder weniger alternirend, oft fast opponiert gestellt, dicht benachbart und mehrere bis viele auf ein Internodium gehäuft; ......; Mündung der Theca meist glatt, Deckel einfach. — Hierher gehören: *Diphasia alata* Hincks, *Sertularia filicula* Ell. et Sol., *abietina* L., *argentea* Ell. et Sol., *cupressina* L., *Thujaria thuja* u. *lonchitis*; *Sertularia diffusa* Allmann, *elongata* Lmx., *tenera* Sars, *maplestonei* Bale, *huttoni*, *Diphasia mutulata* Busk, *Dynamena tubuliformis* Markt." Of the above species *Diphasia alata* and *D. mutulata*, *Sertularia filicula* and *S. abietina* belong to *Diphasia* (the two latter to the subgenus *Abietinaria*), *Sertularia argentea*, *S. cupressina*, *S. tenera* and *Dynamena tubuliformis* to *Sertularia*, *Thujaria thuja* and *Th. lonchitis* to *Thujaria* and *Sertularia maplestonei* to *Odontotheca*. An opercular apparatus has hitherto not been found in *Sert. elongata* and *S. huttoni*, both of which have the hydrothecal margin provided with 6—7 teeth, and if they possess an operculum I am most inclined to think that it consists of as many valves as there are teeth. In either case these two species cannot be referred to any of the hitherto described genera. —

Schneider[1]) after having given the above phylogenetic sketch declares, that to penetrate deeper into the phylogeny of the *Sertulariidae* the close examination of a large living material shall be necessary, especially in order to make a thorough study of the difficult opercular apparatus. I quite agree with the author on this point, but as long as he adheres to the view that the colonial characters are the true generic characters, I cannot see that the results of such a study may be of any great use to him. He concludes his phylogenetic considerations with the following wish: „So steht denn zu hoffen, dass die zukünftige Forschung wohl im Einzelnen das hier vertretene System näher ausbauen und erläuteren, nicht aber es zu Gunsten eines einzelnen diagnostischen

---

[1]) p. 524.

Charakters umstürzen wird; denn die Fundamente scheinen mir durch die innigsten Beziehungen zur Phylogenese als sichere erwiesen". I, on the contrary, take the liberty to express the collegial wish that the considerations and studies contained in this paper may help Dr. Schneider to change his view about the systematic significance of the colonial characters. —

Professor Kristine Bonnevie who has published several papers on Norwegian and North-Atlantic Hydroids, among which is the report on the Hydroids from the Norwegian North-Atlantic Expedition, quite agrees with Schneider in his systematic view, and in the last named work says about the systematic arrangement proposed by the present author[1]): "In this family as in *Campanulinidae* Levinsen has made a division of genera based upon the nature of the lid of the hydrotheca. But the remark that I made previously is also applicable here, namely, that the nature of the lid and of the margin of the hydrotheca, are very good specific distinguishing features, but that in basing a system upon these characters we ascribe to them too much importance." Though the author thus acknowledges the diversities found in the opercular apparatus at least as very good specific characters she does not mention the structure of the operculum in any of the species named in her work, not even in the new species described by her.

While Bonnevie gives to each species the name of the group to which it is referred, another follower of Schneider's system, Mr. H. B. Torrey[2]) does not think it necessary, and, besides, as far as I understand him, thinks it an advantage not to do so. He expresses himself as follows: „Anyone who has had occasion to work among the *Sertulariidae* will admire the masterly way in which Nutting has dealt with the perplexing questions of classification in that family. I am not yet prepared, however, to abandon Schneider's plan of segregating the species into typical groups which shall take the places of genera. These groups do

---

[1]) 12, p. 76.
[2]) 58, p. 21.

not necessarily give their names to the species which the include. Thus they discourage the growth of synonyms, offer no awkward bars to the free passage of any species from one group to nearer relatives, and at the same time lessen the confusion which the present unsettled state of opinion regarding the relationships of existing species tends to produce." When the groups are to take the places of genera, one should believe that the generic names must be quite superfluous except as synonyms, and I am at a loss to understand in what manner this retention of them may be able to diminish the growth of synonyms or to lessen confusion of any kind, as I am much more inclined to think that this method would have quite the opposite result.

In the year 1904 Professor C. C. Nutting, Iowa, published a most valuable work on the American *Sertulariidae*, in which as a result of his systematic investigations into this family he sets forth the assertion that the characters taken from the operculum and the hydrothecal margin are insufficient in themselves to furnish a base for the classification of the *Sertulariidae*[1]), though he „thinks them most important aids in defining certain genera" and, besides, he quotes parts of an unpublished manuscript on the structure of the operculum written by Mr. J. H. Paarman[2]), according to which the representation the present author has given of the operculum in the *Sertulariidae* is incorrect. I am first to treat the latter point, and the following representation of the results to which the two authors have arrived chiefly refers to *Sertularia pumila*.

According to the named authors the hydrothecal margin is provided with two lateral teeth, between which there are stretched two quite homologous membranes of unequal size, the abcauline being considerably larger than the adcauline one. They form together the side-walls of an A-tent, the front and rear of the tent being closed by the two opposite hydrothecal teeth, and there-

[1]) 44, p. 41.
[2]) 44, pp. 20, 40.

fore, the two membranes which are both regarded as flaps meet in a straight line that would be represented by the ridge pole of the tent. When the hydranth emerges in the outer world for the first time the first cleavage takes place along this line, but it continues until there is room for the egress of the hydranth, leaving the bottom of both flaps still attached to the hydrothecal margin. Mr. Paarman's investigation seems to prove that..... "Sometimes the adcauline piece is attached while the other is free, and sometimes the reverse is true. Often the sides of a flap are attached for a greater or less distance proximally while they become free distally, the degree of attachment varying greatly in the same species. In most cases both flaps are functional". Paarman and Nutting seem to have overlooked, that in *Sertularia pumila*[1]) the adcauline wall is angularly bent from side to side and is provided between the two larger teeth with a much smaller one, which divides the adcauline sinus into two lateral halves but does not reach the free margin of the adcauline membrane stretched between the two larger teeth. This membrane which must be regarded as the distal part of the adcauline wall is of course also angularly bent, and the ridge dividing it into two lateral halves arises from the tip of the median tooth. The much larger abcauline membrane consists, as the corresponding part of a *Thujaria* and a *Diphasia*, or as one of the three or four corresponding parts of a *Sertularella*, of a proximal part, fixed in the abcauline sinus, and a distal free valvular part provided with an angularly bent margin which fits into the corresponding sinus formed by the adcauline membrane. When the hydrotheca is closed, the adcauline membrane on account of its thinness inclines a little towards the centre of the aperture, and its free margin meets that of the adcauline valve, but a perfect closing of the hydrotheca can only take place when both membranes are fixed in their corresponding sinusses to the very tips of the teeth, and this is always

[1]) Pl. IV, fig. 14; 27, pl. 11, figs. 1—3.

the case in every undamaged hydrotheca. The one cause of Paarman's mistake is that he has regarded these opercula only from the side and not from the abcauline surface. When such a closed hydrotheca is regarded from the side we get the impression of an A-tent, as we see a straight line limiting two membranes which might be regarded as two flaps, but this line is only the one side of the free abcauline triangular valve, which on closing fits into the corresponding sinus formed by the angularly bent adcauline membrane. The other cause is that he has studied these opercula by the aid of microtomic sections, as there can be no doubt that the cutting in many cases must have in different degree loosened the connection between the fine membranes and the hydrothecal margin. Therefore he has found that the degree of attachment between the membranes and the hydrothecal margin is very different even in the same hydrotheca, but as a rule both membranes have been torn away from the hydrothecal teeth („as a rule both flaps are functional").

Though I must, therefore, maintain the correctness of my earlier investigation I am willing to admit, what I formerly denied, that the adcauline membrane may be regarded as a part of the opercular apparatus, and that the operculum of *Sertularia* therefore may be called a two-lipped operculum. For this renewed investigation I have examined fresh material taken in the Trondhjemsfiord by Mr. O. Nordgaard, and I have used the same mode of preparation as earlier, namely with a fine needle to cut off under the microscope the distal end of the hydrotheca and thereafter to examine it in different positions. Colouring matter may help to make the membranes more distinct.

After having expressed his agreement with Mr. Paarman's results Professor Nutting continues: "But there is still another and even greater objection to relying exclusively upon the characters of the margin and operculum in classifying the *Sertulariidae*, and that is that these characters are inconstant not only in some of its genera, but also in some individual species." To prove the

correctness of this assertion the author selects 8 species of the 128 treated in his work, in which the characters taken from the margin and operculum either are not found in some species of a certain genus as defined by him or in some species of two other genera show a supposed variation or inconstancy, and as a consequence hereof he prefers to use as chief characters in the limitation of most genera diversities in the arrangement of the hydrothecae or in the form of the colony, but at the same time he lays the chief stress on the opercular apparatus and the form of the hydrotheca in the diagnosis of the two genera *Diphasia* and *Abietinaria*. I intend here to undertake a critical examination of the genera proposed by Prof. Nutting, and under each genus I shall mention not only the species in which this author has thought he found inconstancy in the hydrothecal characters, but also those which to my opinion ought to be referred to another genus. —

In his work on the American *Sertulariidae* Prof. Nutting gives the following diagnosis of the genera as far as concerns the trophosomes, but as the gonosomes on the whole play a very insignificant systematic part, I have not found it necessary to refer to that part of the diagnosis concerning these structures. I shall later mention these structures in my own diagnoses of the same genera.

Sertularia (L.) Nutting.

"Hydrothecæ in strictly opposite or rarely subopposite pairs. Stem and branches normally divided into regular internodes, each of which bears a pair of hydrothecæ, but sometimes there are more than one pair to the internode, in which case the hydrothecæ are strictly opposite. Operculum normally of two flaps."

Thujaria (Flem.) Nutting.

"Hydrothecæ normally subopposite to alternate, and more than two to each internode. Internodes vary greatly in length. Hydrothecæ with smooth margin, or with one or two teeth usually more or less immersed in the hydrocaulus. Operculum of one abcauline flap, or of two flaps."

Pasythea (Lamour) Nutting.

"Hydrothecæ biserial, strictly opposite, arranged in groups of pairs, a group to an internode, the upper pair being smaller and differing in shape from the lower, margin bilabiate, with a too-flapped operculum."

Sertularella (Gray) Nutting.

"Hydrothecæ biserial, strictly alternate, usually with three or four marginal teeth and a well-marked operculum with three or four flaps. Rarely the teeth are obliterated, in which case the operculum is stretched across the hydrothecal aperture like a drumhead. Branches never regularly anastomosing to form a reticulate flabellate structure."

Dictyocladum Allm.

"Colony flabellate in form. Branches anastomosing and forming a rudely reticulate structure or network. Hydrotheca on more than two sides of the stem. Aperture without conspicuous teeth. Operculum variable."

Diphasia (Agass.) Nutting.

"Hydrothecæ biserial, opposite or alternate, aperture broad, operculum evident, of a single adcauline flap."

Abietinaria (Kirchenp.) Nutting.

"Hydrothecæ non strictly opposite, more or less bottle-shaped (the proximal portion turgid, distal portion narrowed), operculum of a single adcauline flap, margin usually without teeth.

Selaginopsis (Allm.) Nutting.

"Hydrothecæ arranged in more than two longitudinal series, at least on distal parts of branches, or in two or more series each of which has the distal ends of the hydrothecæ turned alternately to the right and left. Operculum of a single abcauline flap. Internodes long or absent."

As chief characters for the two genera *Sertularia* and *Thujaria*, to which the author only refers species with two-serial hydrothecæ, he uses both the different arrangement of the hydrothecæ and the length of the internodes. The hydrothecæ may be

opposite or alternate, but between these two conditions there is found all possible intermediate stages (strictly opposite, opposite, subopposite, subalternate, alternate, strictly alternate), and in many species a certain variation is found even within the same colony The internodes may be of very different length, bearing one to many pairs of hydrothecæ, and also in this respect many species present great variation within the colony. When the internodes are very short the hydrothecæ must of course be opposite, and the alternate hydrothecæ, therefore, must be found in longer internodes, but the latter are not rarely provided with opposite hydrothecæ (*Thujaria lichenastrum* Pall., *Th. sinuosa* Bale e. t. c,). In opposition to what is said in the diagnosis we very often in species of Nutting's *Thujaria* find internodes with a single pair of hydrothecæ, and the author f. inst. figures branches of *Th. polycarpa*, *Th. argentea* and *Th. tenera*, which bear a series of 2—4 such internodes. In *Sertularia grisea* Kirch, which is provided with internodes bearing 1—5 pairs of subopposite hydrothecæ, I have seen branches with up to 12 such internodes. According to the diagnosis of *Sertularia* there may be found in the genus subopposite hydrothecæ, but when the internodes bear more pairs of hydrothecæ the latter are said to be strictly opposite. I do not understand why they may not be subopposite, but in either case they seem to be so in a rudiment of *Sert. Challengeri* figured by the author. It is evident, that the different arrangement of the hydrothecæ cannot give us a distinct delimitation between the two genera, and if we use the different length of the internodes we meet with the same difficulty when we try to draw a boundary line; but even if it were possible by means of the above characters to divide the species into two sharply separated groups, the latter would still be artificial, if we paid no attention to the structure of the hydrothecæ and both groups contained species belonging to different natural genera.

Sertularia (L.) Nutting.

We may first regard the inconstancy in the structure of

the hydrothecal margin and the operculum which Prof. Nutting believed he found in *Sertularia desmoides* Torr., and which he mentions in the following way: "No marginal teeth as a rule, but at times the margin has two obscure teeth. Operculum usually of one flap attached to the abcauline side, others with two ill-defined flaps, and again there will be two flaps one above the other, both attached to the abcauline side." *S. desmoides*, of which Prof. Nutting has been so kind as to send me a number of specimens, is a good *Thujaria* according to my definition of the genus, though it corresponds well to his definition of *Sertularia*. It has a quite similar aperture to that found in *Th. lichenastrum* and *Th. (Pasythea) acrodon*, being provided with a freely prominent distal adcauline wall. In the specimens examined a number of hydrothecæ have been regenerated, and Prof. Nutting may have mistaken the freely prominent part of the new distal wall for an adcauline flap. The regeneration also explains the presence of two abcauline flaps one above another.

In the key to the species the author mentions that three of the species, *S. rathbuni*, *S. brevicyathus* and *S. flowersi* are provided with a small median tooth. Such a tooth, however, is also present in *S. pumila*, and according to the author's figures also in *S. mayeri*, and *S. cornicina*. *S. rathbuni* has not a three-flapped operculum; but the author has mistaken the angularly bent adcauline lip for two separate opercular valves.

S. operculata, *S. bispinosa* and *S. pulchella* belong to my new genus *Odontotheca* the definition of which is given later.

Thujaria (Flem.) Nutting.

Only four of the twenty species named in Prof. Nutting's work, namely *Th. thuja*, *Th. polycarpa*, *Th. immersa* and *Th. lonchitis* belong to my genus *Thujaria* while 10 belong to *Sertularia*, and in two of these, *Sert. tenera* and *Sert. robusta* the author seems to have found inconstancy in the structure of the hydrothecal margin and operculum. The named structures of *S. tenera* he mentions in the following way: "margin varying greatly, some-

times being round without teeth and often being curved, with two teeth of regular sertularian type. Operculum usually composed of one flap attached to the abcauline side of margin, but sometimes composed of two flaps." "This species appears to break down the generic distinctions proposed by Levinsen in that it has both a one-flapped and a two-flapped operculum in the same specimens." About the same parts of *S. robusta* he says: "operculum with two flaps on distal portion of branches, often with round margin and single abcauline flap on proximal portions."

Both in my paper on the regeneration of the Hydroids[1]) and in that on the Hydroids from Greenland[2]) I have pointed out, that in the new apertures produced by the regeneration of a hydrotheca in a *Sertularia* the contrast between the thicker and the thinner (membranous) parts of the wall often seem to be indistinct or quite lacking, and as a distinct example hereof I have named *Sertularia tenera*. As I have examined many colonies of this species without finding any other inconstancy in the parts named I am sure that the round apertures found by Prof. Nutting, must have belonged to regenerated hydrothecæ and Ritchie[3]) has come to the same result as I. Of *Sertularia robusta* I have examined a colony from Bering Sea sent to me by the National Museum of Washington. All the hydrothecae present the *Sertularia*-characters very distinctly, and when Prof. Nutting in a number of hydrothecae from proximal portions of branches has found a different form of aperture and operculum, it is no doubt due to cases of regeneration.

Nutting[4]) declares that the operculum is almost an ideal character to use in separating the genus *Diphasia*, but that he nevertheless prefers the colonial characters is seen from his reference of *Sertularia thujarioides* Clark to *Thujaria*, though it pos-

---

1) 32 a, p. 22.
2) 32, p. 189—190.
3) 53, p. 218.
4) 44, p. 44.

sesses an adcauline operculum and a horizontal margin, characters which have not been found in any *Thujaria*. Broch has already pointed out that it must be referred to *Diphasia*. To the latter genus I am also inclined to refer *Th. elegans* Krp. *Th. ramosissima* Allm. and *Th. plumosa* Clark belong to my new genus *Odontotheca*, and I shall later show that *T. plumulifera* Allm.[1]) belongs to the genus *Hydrallmania*. However, a fragment sent to me by Prof. Nutting under the name of *Th. plumulifera* does not belong to this species, but to a new species of the genus *Sertularia*.

Pasythea (Lamour.) Nutting.

This highly artificial genus is at present represented by three species, namely *P. qvadridentata* Ell. & Sol., *P. hexodon* Bale and *P. philippina* Markt. The first, which is a *Sertularia*, is nearly related to *S. pumila*, the second, of which I have examined a colony from Singapore, is a *Thujaria* with a similar form of aperture to that found in *Th. desmoides*, *Th. lichenastrum* and *Th. fruticosa*, and the original specimen of the third which I have had on loan from the Zoological Museum of Vienna is a young colony of *Idia pristis*. That neither the colonial characters are constant is evident from some observations made by Bale[2]) who says about specimens of *P. qvadridentata* from Bondi: "The Bondi specimens are peculiar, a considerable proportion of the internodes bearing only a single pair of calycles each; indeed some of the shoots are so arranged throughout, and thus differ in no respect from a typical *Sertularia*." Further he says about the hydrothecæ of *P. hexodon*[3]): "In most cases those on the two sides of the hydrocaulus are opposite to each other, but it is quite common to find them alternate, and the set frequently contains more on one side than the other, as three to four, or four to six.

---

[1]) I have examined a fragment of the original specimen, sent to me from the Museum of Comp. Zoology, Cambridge.
[2]) 8, p. 770.
[3]) 8, p. 771.

Sertularella (Gray.) Nutting.

Among the species which Nutting selects as examples showing inconstancy in the hydrothecal characters are the following three species, which he refers to the genus *Sertularella*. For each of them we shall quote that part of the author's description which refers to the hydrothecal margin and the operculum:

S. formosa Fewkes. "Aperture perfectly round and smooth. Operculum apparently wanting. Sometimes, however, it appears in the shape of a thin membrane stretched like a drumhead across the aperture."

S. Hartlaubi Nutting. "Margin perfectly smooth and even: operculum in some cases an adcauline flap; in others apparently an irregularly ruptured membrane, stretched across the aperture like a drumhead."

S. magna Nutting. "Operculum thick conspicuous, a simple membrane of a simple flap where the margin is even, with two flaps when there are two evident teeth, sometimes apparently with more than two flaps, but they are not well defined, probably because the teeth when three or four, are very low and inconspicuous. No better example could be found of the futility of basing generic distinction on the number of parts to the operculum. One branch could be placed in three different genera, were that criterion to be used."

I have not seen the two first named species, but the descriptions and the figures leave no doubt that they cannot be referred to *Sertularella*. There is not the faintest indication of marginal teeth, and the thin membrane stretched like a drumhead across the aperture is no doubt the original membranous roof of the hydrotheca, which is found in all *Thecaphora*. The author does not mention whether he has found this membrane also in old hydrothecae. It is possible that a number of *Sertularella*-species may have developed from that group, to which they belong, by a transformation of the membranous roof into a *Sertularella*-operculum, but as they themselves lack the chief-characters of

Sertularella I cannot refer them to this genus. We might with the same right refer f. inst. the inoperculate species "*Obelia*" *marginata* Allm.[1]), *Campanularia insignis* Allm.[2]) and *Camp. juncea* Allm.[3]) to *Thyroscyphus*, because they agree with the species of this genus in the form and the arrangement of the hydrothecae.

From the National Museum of Washington I have received a small fragment of the original specimen of *Sertularella magna* Nutt. It contains 12 hydrothecae, the 6 of which have the margin more or less injuried, while in the 6 others it is intact, and provided with three distinct curves, divided from each other by as many distinct teeth (pl. IV, figs. 27, 28). When regarded from above the aperture is distinctly triangular with curved sides. In none of them have I found a complete operculum, but in some of them small remnants of the opercular valves still adhere to the curves, and in a single hydrotheca two complete valves are fixed each in its curve while the third is missing. The species seems to be very fragile, but there can be no doubt that the hydrothecae when undamaged are provided with three opercular valves, and that Nutting's divergent statement must be explained as an incorrect interpretation of acccidental injuries. The hydrothecae have been regenerated 4—6 times.

Dictyocladium (Allm.) Nutting.

The latter part of Prof. Nutting's diagnosis of *Sertularella* does not mean that an operculum of three or four valves cannot be found in species which possess a flabellate colony with anastomosing branches, but only that such species are referred by the author to the artificial genus *Dictyocladium*. While *D. dichotomum* Allm. does not seem to possess an operculum the two other species referred to this genus, *D. flabellum* Nutt. and *D. reticulatum* Krp. belong to *Sertularella*. Of the latter species I have examined a fragment sent to me from the Zoological Museum of Hamburg, and

---

[1]) 1, pl. VI, figs. 1, 2.
[2]) 5, pl. IX.
[3]) 2, pl. 11, figs. 3, 4.

in the best preserved hydrothecæ I have found a distinctly three-toothed margin and three opercular valves.

Diphasia (Agassiz) Nutting.

Of the nine species mentioned in Nutting's work I must refer *D. corniculata* (Murray) to *Sertularia*, and *D. tamarisca*, which possesses a three-toothed hydrothecal margin and three opercular valves, to *Sertularella*.

Abietinaria (Kirchenpauer) Nutting.

Of the 16 species, which Nutting refers to this genus, I have here to mention three, namely *A. compressa* Mereschk., *A. Alexanderi* Nutt. and *A. greenei* Murray, and of the two latter species I have examined specimens sent to me by Prof. Nutting. The first-named species, which the author no doubt refers to *Abietinaria* because of the form of the hydrothecae, is according to Mereschkowsky provided with two lateral teeth, and as such are not found in any species of that genus, I cannot doubt but hat it belongs to *Sertularia*. *A. Alexanderi* is also a *Sertularia*, being provided with two lateral teeth, an angularly bent adcauline membrane, and an abcauline membrane, which ends with a free valve.

The hydrothecae of *A. greenei* are as pointed out by Nutting subject to great variation, the abcauline margin being in most of them provided with two more or less developed teeth, while a number of the proximal hydrothecae in each branch have a plain margin without teeth. The specimen examined by me seems to contain only dead hydrothecae, and I have found only a small number of opercular membranes, a few of which reached from the adcauline margin to the tips of the teeth, and, therefore, I am most inclined to refer this species to my new genus *Odontotheca*. In such hydrothecae which have no teeth the opercular membrane must be provided with a free abcauline margin, and this species therefore seems to form a connecting link between *Odontotheca* and *Abietinaria*. The hydrothecae are provided with a small internal adcauline tooth, and a similar more or less developed tooth I have

found both in a number of species belonging to the latter group and in *Odontotheca macrocarpa* Bale.

A species, which presents a still greater variation, is *Thujaria heteromorpha* Allm.[1]), which according to the author possesses two different forms of hydrothecae, some in which the margin is nearly circular and even directed away from the supporting internode, and others[2]) in which it is "directed towards the internode, and has its apocauline margin produced into a short, slightly incurved tooth." While the former are placed in the proximal part of the branches, the internodes of which carry many hydrothecæ, the latter are seated in the distal part, and here each internode bears a single pair of hydrothecæ. A further difference is that the hydrothecæ of every pair are in some internodes connate to one another, but in others separate.

Allman expresses his doubt as to the correct reference of this species to *Thujaria* in the following way: "Amid systematic characters pointing in so many different directions, it would seem difficult to decide on the true generic position of our Hydroid," and I shall hereto remark that we shall only be able to solve this question when we get information about the structure and position of the operculum, but otherwise the shape and position of the aperture in the two different forms of hydrothecæ leave little doubt that the species must belong to the genus *Diphasia*.

---

[1]) 4, p. 147.

[2]) According to the figures given by Allman the last named hydrothecae have quite the same form as those found in *Thujaria pharmacopola* Allm. (5, p. 66), but as pointed out by Billard (10, p. 1357) the latter species is identical with *Diphasia alata* Hincks, and the hydrothecae of this species have not the slightest likeness with Allman's picture, their abcauline margin being broadly rounded and not at all acuminate. Therefore I am not quite sure, whether the corresponding hydrothecae of *Th. heteromorpha* are correctly figured. In the same paper Billard points out that *Thecocladium flabellum* is a *Sertularella*, that *Thujaria pectinata* is identical with *Th. articulata* Pall. and *Th. vincta* with *Sertularella quadridens* Bale. Having examined myself fragments of the original specimens of the three first named species I can confirm as to them the correctness of Billard's observation.

The author further adds[1]: "The features here noted in *Thujaria polymorpha* bring to mind a phenomenon not unknown in the vegetable kingdom; as in the case of certain ephiphytical orchids, in which flowers whose differences of form are such as to have caused them to be regarded as characterizing so many distinct genera, are nevertheless found associated in one and the same plant." I do not think, however, that the last named case has induced any botanist to prefer systematic characters taken from the form of the inflorescences to those presented by the individual flowers.

Hydrallmania (Hincks) Nutting.

I shall later mention this genus to which Prof. Nutting besides *H. falcata* refers two other species, *H. distans* Nutting and *H. franciscana* (Trask).

Selaginopsis (Allm.) Nutting.

While Mereschkowsky to this genus refers all *Sertulariidæ*, the hydrothecæ of which are arranged in more than two longitudinal series, Allman excepts such species which may be referred to the artificial genera *Pericladium* Allm. and *Dictyocladium* Allm. According to the above definition Nutting only refers to *Selaginopsis* such polyserial species, which belong to my genera *Thujaria* and *Sertularia*, and of the species named in his work in either case *S. mirabilis* must be referred to *Sertularia*, but I am not sure, whether this may not be the case with some of the others, as f. inst. *S. ornata* and *S. pinnata*[2]).

Among the species which Prof. Nutting in the general part of his work selects to show the inconstancy of my systematic characters is also *S. mirabilis*, about which he says: "In *Selaginopsis mirabilis* (Verrill) there are two flaps to the operculum, while the one-flapped operculum is characteristic of the genus as a whole. I do not believe that any one would separate *S. mirabilis* and *S. cylindrica* (Clark) generically, and yet they differ in this feature upon which Levinsen bases his genera."

---

[1]) 4, p. 148.

[2]) I have not seen these two species.

That the genus *Selaginopsis* according to the different manner in which it is understood by different authors contains species with two, three or four different forms of opercular apparatus is to my opinion a proof that the genus is an artificial assemblage of species, belonging to different genera, and not as Nutting means a proof that my systematic characters are inconstant. But even if all the species contained in the genus were provided with the same form of opercular apparatus I should reject it as unnatural if it were based on the chief character, that the hydrothecæ are arranged in more than two longitudinal series, as I should reject a Bryozoan genus containing for inst. the *Caberea*-species provided with more than two longitudinal series of zooecia. I do not deny that *Sel. mirabilis* and *Sel. cylindrica* have a very similar habitus because of the similar arrangement of the hydrothecæ, but the outer likeness ought to have nothing to do with the systematic arrangement, and as the two species show a distinct difference in the structure of the hydrothecal margin I must put them into two different genera.

As Prof. Nutting has come to the incorrect result that the characters taken from the operculum and the hydrothecal margin are inconstant, he has in the systematic arrangement of the *Sertulariidæ* committed the same error as most authors, of laying chief stress on the colonial characters, and if his genera do not contain such a heterogeneous assemblage of species as Schneider's groups, it is only because he has paid more attention to the structure of the operculum. His best defined genera therefore, are *Abietinaria* and *Diphasia*, in which the chief character is the adcauline position of the operculum, while the colonial characters used are essentially negative.

Before proceeding to give definitions of the single genera of the *Sertulariidae* I shall set forth some considerations on the relation between the four families *Campanulariidae*, *Lafoëidae*, *Campanulinidae* and *Sertulariidae* in order to define the systematic position of the latter family.

The four families may be defined in the following manner: *Campanulariidae*: The campanulate or cup-shaped hydrothecae which not rarely present longitudinal ridges and marginal teeth are as a rule provided with a well-developed stalk, and with few exceptions (*Hypanthea*, *Silicularia*) show a poly-symmetrical structure. A diaphragm is always present, but sometimes only in the shape of a marginal thickening. Nematophores are never present. No operculum. [A club-shaped proboscis].

Lafoëidae: The elongate, cup-shaped, retort-shaped or tubular, short-stalked or sessil hydrothecae, which never present longitudinal ridges or marginal teeth, not rarely show a more or less pronounced bilateral symmetry, and their adcauline wall is in many cases in different extension more or less firmly connected with the stems and branches. A diaphragm may be absent or developed in different degree. Nematophores are sometimes present. No operculum. [A conical proboscis].

Campanulinidae: The more or less elongate, cup-shaped, pitcher-shaped or tubular, sessile or stalked hydrothecae, which never present longitudinal ridges or marginal teeth[1]), sometimes show a bilateral symmetry, and are rarely provided with a complete diaphragm. Nematophores are sometimes present. A differently formed operculum. [A conical proboscis].

Sertulariidae: The pitcher-shaped, retort-formed or tubular, bilaterally developed hydrothecae lack a free stalk, and the ad-

[1]) S. F Clark (16, p. 12) has described a species of *Campanulina*, *C. denticulata*, in the hydrothecae of which he thought he found besides an operculum of convergent segments an equal number of large castellated marginal teeth arising outside the latter. As both the marginal teeth and the operculum must have been formed as a secretion from the ectoderm we cannot understand the formation of the teeth, as the corresponding part of the ectoderm should have been placed outside the operculum. There can be no doubt but that the "castellated teeth" are only the worn segments of an old operculum. The figures 6 a and 6 b, therefore, represent two hydrothecæ, which have been regenerated three times, and the only hydrotheca (fig. 7) in which the author could "find no trace of teeth, only an operculum" is a hydrotheca which has not been regenerated.

cauline wall is as a rule in different extension firmly connected with the stems and branches. A complete diaphragm is as a rule developed. Nematophores are never present. An operculum is always present, consisting of 1—4 opercular membranes or valves fixed in corresponding sinuations of the margin. [A conical proboscis].

Of the characters named in the above diagnosis I have put that which concerns the form of the proboscis in parenthesis, as I have only been able to verify it myself in rather few forms, the proboscis being a structure, the form of which can only be examined with advantage in well-preserved material. I am not sure, therefore, that it really presents so sharp contrasts that the *Campanulariidae* by the aid of the above named character can be sharply divided from the three other related families. According to Allman[1]) and Hincks[2]) we have to discern between two forms of proboscis, a "conical", present in the large majority of the Hydroid families, and a "trumpet-shaped" which has only been found in the *Eudendriidae* and the *Campanulariidae*. While Hincks in the diagnosis of the latter family calls the proboscis "trumpet-shaped", in the diagnosis of the genus "*Campanularia*" he speaks about a "cup-shaped" proboscis, and as these two terms therefore must be synonymous, it is evident that Hincks when he uses the expression "trumpet-shaped" especially thinks of the expanded end of a trumpet. The two latter terms, however, are very unlucky and misleading, as every proboscis in its expanded state is "cup-shaped" or "trumpet-shaped", while at the other side the proboscis of *Eudendrium*, *Campanularia* and *Laomedea* is "club-shaped" or bulbiform, not only according to my own examination of well-preserved material, but also according to figures given by Allman and Hincks. In well-preserved specimens of *Sertularella tricuspidata* and *Halecium muricatum*, lately brought home from Greenland, I have found that the expanded proboscis is "cup-shaped" while it is conical in its contracted state, and when Hartlaub[3]) in his work on *Sertularella* says about the proboscis of this genus: "Die

[1]) 1 a. [2]) 22. [3]) 19, p. 12.

Proboscis der Hydranthen ist nach vortrefflich conservierten Exemplaren zu urtheilen nicht conisch sondern wie bei den *Campanulariden* trompetenförmig," I cannot doubt that he here speaks about the expanded proboscis. Besides in the monograph of Hincks, we find figures of the contracted campanularian proboscis also in a paper of Pictet[1]), in which he figures a number of *Clytia*-species, the proboscis of which he designates as "hypostome en trompette", but according to the figures it is club-shaped, and the same form shows the proboscis of *Hebella lata* Pictet, the hydrothecae of which are much more campanulate than in most members of the family *Campanulariidae.*

According to the systematic arrangement expressed in the above diagnosis, all the operculate forms have been referred to the two families, the *Campanulinidae* and the *Sertulariidae*, and all the inoperculate to the *Lafoëidae* and the *Campanulariidae.* While the presence of an operculum sharply divides the operculate from the inoperculate families, the two families contained in each of the two groups are not sharply divided from each other by a single character, if we do not possess such a difference between the *Campanulariidae* and the *Lafoëidae* in the form of the proboscis. Broch[2]) and Kramp[3]) believe they find such a distinguishing character in the different appearance of the gonothecae, which according to these authors in the *Lafoëidae* always present themselves united into more or less densely crowded aggregates ("Coppinia", "Scapus"), while in the *Campanulariidae* they appear singly. But in both families there are a number of exceptions to this rule. In the *Lafoëidae* large singly placed gonothecae have been found in *Lafoëa (Halisiphoniu) megalotheca* Allm.[4]); *Hebella calcarata* Ag.[5]) and *H. cylindrica* v. Lend.[6]), and by the present author in

---

[1]) 46.
[2]) 13, p.
[3]) 30, p. 370—71.
[4]) 5.
[5]) 6 a, p. 122, figs. 190—191.
[6]) 46, p. 41, pl. II, fig. 36.

H. contorta Markt.[1]) (Pl. V, figs. 16, 17) and *Lafoëa venusta* Allm.[2]). Such large singly placed gonothecae have also been found in two species of the genus *Cryptolaria*, namely in *Cr. abyssicola* Allm.[3]) and *Cr. diffusa* Allm.[3]), while two other species, *Cr. longitheca* Allm.[4]) and *Cr. conferta* Allm.[3]) have a Coppinia. Nutting[5]), however, ascribes to the whole genus *Cryptolaria* "a compact Coppinia" mass much as in *Lafoëa*", and the reason hereof is the following. Pictet and Bedot[6]) have found in *Perisiphonia pectinata* a Coppinia surrounding a portion of the stem and, besides, two small singly placed gonothecae, seated each in the proximal part of an adjacent branch. As Nutting[7]) and Broch[8]) have found that the Coppiniæ, examined by them, contain gonothecae of both sexes, Bedot suggests that the single gonothecae found in the named *Perisiphonia* may represent a different sex from those in the Coppinia, and Nutting, therefore, no doubt, compares the single gonothecae found in the above *Cryptolaria*-species with those found in the *Perisiphonia*, and thinks that a coppinia may appear later. I do not think, however, that Bedot is right in his supposition. It is a well-known fact that a Coppinia may often

---

[1]) 36. Pictet (46) regards *Hebella cylindrata* Markt., *H. contorta* Markt., and *H. scandens* Bale as identical with *H. cylindrica* v. Lend., and Billard thinks that the same is the case with *H. calcarata* Ag., but be adds the following remark: "Comme Pictet le fait justement remarquer on ne pourra être complètement fixé sur l'identité de toutes ces formes que lorsqu'on aura trouvé et comparé leurs gonosomes" (11, p. 17). The gonothecae of *H. contorta* seem to be very different from those of *H. calcarata* and *H. cylindrica*, figured by Agassiz and Pictet. Their (Pl. V, figs. 16, 17) distal end is divided into 4—6 triangular areas, which no doubt correspond to as many opercular valves. The gonothecae of *H. scandens* Bale (8, pl. XIII, fig. 18) seem to show a similar structure.

[2]) 3.

[3]) 5.

[4]) 15 a.

[5]) 45, p. 946.

[6]) 47, p. 21, pl. V.

[7]) 45 a.

[8]) 13, p. 155.

extend from a stem over more adjacent branches, and, therefore, I cannot doubt but that we have to do in the named case with the beginning of such an extension. In opposition to the numerous small gonothecae of the Coppinia, which take their rise from the peripheral tubes, the few large elongate sacs in the named *Cryptolaria*-species spring from the axial tube, and it is not reasonable to suppose, that in these species the gonothecae of the two different sexes should develop in two so very different manners.

While in the true "Coppinia" the gonothecae are mutually coalesced, the "scapus" is only a collection of more or less densely crowded, but mutually not connected gonothecae. But quite similar, more or less dense aggregates of gonothecae are also found in other families, f. inst. in species of the campanularian genus *Silicularia (= Hypanthea)*[1]), in *Campanularia integra* and in a number of *Halecium*-species, f. inst. in *Hal. muricatum*, in *Hal. groenlandicum* Kramp[2]), and in a new species from Japan, which differs from the last named species therein, that the hydrothecae are perfectly adnate. In the two latter species the gonothecae are borne together with a number of hydrothecae by a large, spongy, richly branched, free meshwork formed by a number of peripheral tubes.

To the *Lafoëidae* I refer besides the genera *Lafoëa (Halisiphonia), Hebella, Grammaria, Cryptolaria, Perisiphonia, (Zygophylax, Brucella)* and *Lictorella* also the species referred to *Synthecium*, *Hypopyxis*, *Staurotheca*, and the inoperculate species referred to *Dictyocladium*, *Selaginopsis*, *Sertularia* and *Sertularella*. Also Schneider refers *Synthecium* to the *Lafoëidae* though from other reasons than I, but Hartlaub[3]), who earlier followed Schneider in this question, has altered his opinion, because he has found that the species of the latter genus are provided with a blind sack, a structure which he regards as characteristic of

---

[1]) 5, p. 26.
[2]) 30.
[3]) 21, p. 670.

the *Sertulariidae.* But Hartlaub[1]) has also found a blind sack in the campanularian genus *Silicularia,* and I have found it in *Lictorella pinnata* Sars. It is also found in the operculate species described as *Zygophylax operculata* Jäd. (Pl. IV, fig. 21) and *Zyg. grandis* Vanh.[2]), and I cannot doubt but that it is also present as well in the inoperculate species related to them as in the other species of the genus *Lictorella.* The presence of the blind sack in the named cases, therefore, seems to be contingent upon the more or less pronounced bilateral symmetry.

v. Campenhausen who also refers *Grammaria* to the *Sertulariidae* says about my reference of *Synthecium* and the other above named forms to the *Lafoëidae*[3]): „Abgesehen aber davon dass die erwähnten Formen so typisch alle übrigen Sertulariencharactere bezitzen ausser diesen einen ..... und mir ..... eine Trennung nur auf ein Merkmal hin willkürlich vorkommt, scheint mir das Vorhandensein oder der Mangel eines Operculums durchaus nicht von so einschneidender Bedeutung zu sein." As v. Campenhausen does not seem to ascribe systematic significance to the arrangement of the hydrothecæ, the typical sertularian characters, about which he speaks, must be the bilateral symmetrical structure of the hydrothecae, and the more or less extensive connection between their adcauline wall and the corresponding axial structures[4]). As to the first named character there is no contrast between the named forms and the other *Lafoëidae,* as most members of this family and especially of its freely branched forms show a more or less distinct bilateral symmetry, which is found not only in species with sessile or adnate hydrothecae, but sometimes also in such species the hydrothecæ of which are provided with free stalks.

---

[1]) 19, p. 12, note.

[2]) 59, p. 315.

[3]) 14 a, p. 301.

[4]) Jf v. Campenhausen regards the presence of a well-developed diaphragm as a specific sertularian character, I may here point out that the diaphragm is quite lacking or imperfectly developed in a number of *Sertularella*-species.

We find f. inst. that the hydrothecae of *Lafoëa fruticosa* and *L. gracillima* show a distinct adcauline convexity. As to the other sertularian characters the genera *Perisiphonia, Cryptolaria* and *Grammaria* have their hydrothecae adnate to the hydrocaulus in a larger or smaller part of their adcauline wall, and in the two last named genera this connection is as in the *Sertulariidae* inseparable, while in *Perisiphonia* it can be loosened by the aid of reagents. As, therefore, the above named forms cannot by a single character be divided from the *Lafoëidae*, I, on the contrary, find it arbitrary to refer them to the *Sertulariidae*, and at the same time there can be no doubt, but that the latter family gains in firmness and coherence by only embracing operculate forms.

In animals of so simple a structure as the Hydroid polyps we can only expect to find a few distinguishing marks between the systematic divisions, and most families and genera are only divided from each other by one or two characters. The two chief divisions, the *Athecata* and the *Thecaphora* are only divided from each other by the presence in the latter of more or less developed protective cases for the hydrants and the gonophores, and it seems reasonable to ascribe systematic significance also to the operculum, a structure, which must be regarded as the complement of the protective cases and, so to speak, as the end-result of the same effort, which has led to the formation of the hydrothecae and gonothecae. We may further point out as an evidence of its systematic importance, that it has that in common with other structures of systematic significance that it presents a rich development of characteristic modifications which give excellent generic characters.

We may now regard the relation between the *Lafoëidae* and the *Campanulinidae*. If we compare the two above family diagnoses we shall find that the two families are only sharply divided by a single character, namely the presence or absence of an operculum, all the other characters being more or less relative, and, therefore, there can be no doubt, that they are very nearly related

as already pointed out by Broch.[1]) He especially points out the near relation between *Toichopoma obliquum* and *Lafoëa*, and not only refers the former genus to the *Lafoëidae*, but is most inclined to refer the named operculate species to the genus *Lafoëa*, and when he provisionally uses the name *Toichopoma* it is only because the gonothecae of this species were at that time unknown. Kramp[2]) has later found that it possesses a "coppinia", but while he like Broch refers it to the *Lafoëidae*, he at the same time maintains that the presence of an operculum entitles this species to represent a proper genus. In a later paper Broch[3]) unites the *Campanulinidae* with the *Lafoëidae* and again divides the latter family into two sub-families, the *Grammariina*, in which the gonothecae are united into aggregates and the *Campanulinina*, in which that is not the case. From the reason given above I cannot accept this division.

The connection between the *Campanulinidae* and the *Lafoëidae* must no doubt be expressed in this way, that the *Campanulinidae* have arisen from the *Lafoëidae*, and this transformation has taken place in such a manner, that different members of the latter family have developed an operculum.[4]) Broch[5]) has pointed out the great likeness between *Toichopoma obliquum* and *Lafoëa gracillima*, but *Calycella syringa* and *Tetrapoma qvadridentatum* present a similar likeness to such *Lafoëa* species as *L. pocillum* and *L. pygmaea.* At the other side the species of the genus *Cuspidella* seem to stand in a similar relation to the species of the genus *Filellum*, in which we find two different forms of sessile hydrothecae, some,

[1]) 13, p. 159.

[2]) 30, p. 375.

[3]) 14, p.

[4]) As I do not believe in a sharp division between the *Lafoëidae* and the *Campanulariidae*, I think it likely that also a number of species of the latter family have developed an operculum, and we have no doubt two such examples in „*Campanularia*" *marginata* Bale (7, p. 54) and „*Camp.*" *macrocyttara* (Bale (7, p. 56), the wide cup-shaped hydrothecae of which have a four-toothed margin, and, therefore, no doubt, possess a *Thyroscyphus*-operculum. The double margin in the hydrothecae of the former species is no doubt due to a regeneration.

[5]) 13, p. 159.

the proximal half of which is adnate, and others which are cylindrical and erect. The first form of hydrothecae is represented in *Cuspidella procumbens* Kramp, and the second in such species as *C. humilis* and *C. costata.* The genus *Zygophylax* (*Perisiphonia*) which is provided with cylindrical nematothecae has given its contingent of operculate forms in the two species, *Z. operculata* Jäderh.[1]) and *Z. grandis* Vanh.,[2]) for which I must propose a new genus *Abietinella*, and *Oplorhiza parvula* Allm.,[3]) in which we find stalked, globular nematothecae stands in a similar relation to „*Campanularia*" *armata* Pict & Bed.[4]) as the above new genus to the species of *Zygophylax.* The genus *Lafoëina* [5]) which possesses a similar form of operculum as *Cuspidella* and *Oplorhiza* only differs from the latter genus in the possession of very long vermiform nematothecae. The long slender, sometimes tubuliform hydrothecae of the genus *Stegopoma* leave no doubt as to the near connection of the latter genus with the *Lafoëidae*, and the different modes of growth of the different species show distinctly how little systematic significance we ought to ascribe to the colonial form. The operculum of this genus is very characteristic, consisting of two plaited membranes, fixed each in a curve, formed by the hydrothecal margin, and thus divided by two triangular hydrothecal teeth. When we find such an operculum in a number of species, presenting a different habit of growth, it is to my opinion more reasonable to think that they belong to the same natural genus, and that the different forms of growth have been produced by the influence of outer circumstances, than to divide these species according to the different colonial form, and to suppose that the same form of operculum may have arisen independently more than once. The latter standpoint has been taken by Prof. Nutting[6]) who has described three new

---

[1]) 26, p. 376.
[2]) 59, p. 315.
[3]) 3, p. 14.
[4]) 47, p. 9.
[5]) 32.
[6]) 45, p. 943.

species of *Stegopoma*, but at the same time he refers a species provided with the same form of operculum to the genus *Cryptolaria*. However, he thinks it likely that a separate genus should be instituted for this species and for *Cryptolaria geniculata* Allm., which possesses a similar form of operculum. As a consequence of this standpoint Nutting mentions the genus *Stegopoma* as follows: "This genus ..... seems to me to be practically convenient whether a natural one or not." We meet in this genus with three different forms of growth. While *St.* (*Crypt.*) *operculata* Nutt. and *St.* (*Crypt.*) *geniculata* Allm. have a fascicled stem with an axial tube, *St. plicatile* and *St. gilberti* Nutt. possess a fascicled stem, in which all the tubes bear hydrothecae, and *St. fastigiatum* a creeping stem. The gonothecae are of two different forms which seem to be independent of the colonial form. In two species with a creeping stem, described by Nutting, we find sessile gonothecae of a similar form as the hydrothecae, and the same is the case in *St. gilberti*, while in *St. plicatile* and *St. geniculatum* the gonothecae are elongate sacs without an operculum.

Schneider[1]) thinks that the operculum of *Campanulina* (and *Opercularella*) must be derived from the hydrothecal teeth of certain *Campanulariidae*, which by attaining a sufficient length and thinness have been able to collapse and cover the hydranth after its retraction, but this is a more theoretical consideration, not sustained by any fact, and it may have been called forth by a comparion for inst. of the figures given by Hincks of *Gonothyraea gracilis* and *Campanulina turrita*, as the hydrothecal teeth in the former figure are very much like the segments of the operculum in the latter. But in *G. gracilis* as in all other dentate *Campanulariidae* the hydrothecal teeth are divided from each other by interstices which have once been filled by membranous parts, and these have been thrown off together with the hydrothecal roof. On the contrary in *Cuspidella*, *Lafoëina* and *Oplorhiza* as in *Campanulina* and *Opercularella* the operculum is formed by a continuous

[1]) 54, p. 512.

belt representing the upper part of the side-walls after the roof has been thrown off, and the only difference between the operculum in the three former genera and that of the two latter is that in *Campanulina* and *Opercularella* it has been cleft in a number of segments, which, however, together represent the whole belt. These segments are really not triangular, but about rectangular or tongue-shaped, and only seem to be triangular because they cover each others' margins. Besides, the proboscis of *Campanulina* and *Opercularella* is according to Hincks conical and not claviform as in the *Campanulariidae*, and on the whole there can be no doubt but that the two genera must be derived from the *Lafoëidae*.

The species of the genus *Thyroscyphus*[1]) remind us, both in the form of their short-stalked hydrothecae and in the structure of the colony, of such inoperculate species as „*Obelia*“ *marginata* Allm.,[1]) „*Campanularia*“ *insignis* Allm.,[2]) „*Campanularia*“ *juncea* Allm.[3]) and „*Campanularia*“ *rufa* Bale,[4]) all of which possess more or less elongate, somewhat bilaterally symmetrical hydrothecae. The form of the proboscis is not known in any of these species, but in *Th. simplex* I have found a conical proboscis, and the same form of proboscis has also been found by Ritchie in *Thyroscyphus simplex* Lmx. (non = *Th. simplex* Allm.), for which he has instituted the genus *Parascyphus*. The latter species is distinctly bilaterally symmetrical and provided with a blind sack, and Ritchie, therefore, refers it to the *Sertulariidae*, but as the hydrothecae have a short stalk I prefer to refer it to the *Campanulinidae*. It is, however, doubtful whether this species is sufficiently different from the species of *Thyroscyphus* to represent a proper genus. The tripartite operculum is not a sufficient, distinguishing character, and also the other species of *Thyroscyphus* present a more or less developed bilateral symmetry. Perhaps they also possess a blind sack.

A comparison between the different opercula found in the

---

[1]) 3.
[2]) 5.
[3]) 2.
[4]) 7.

Campanulinidae shows that we have to discern between 6 different types, and in two of these the operculum is formed of the whole hydrothecal roof. This is the case with the univalvular adcauline operculum of *Abietinella*, and with the three- or four-valvular operculum in *Thyroscyphus*, and *Tetropoma.*[1]) A third type is represented by the operculum of *Calycella*, which, as shown by Kramp,[2]) is formed of the peripheral part of the roof, while in the three last types it is formed of a smaller or larger distal part of the side-wall after the roof has been thrown off. In *Toichopoma* it is formed by an infolding of the side-wall at the one side, while in *Cuspidella*, *Lafoëina*, *Oplorhiza*, *Campanulina* and *Opercularella* it is formed of the whole distal part of the side-wall. The sixth type is represented by the operculum of *Stegopoma* about which we have already spoken. The difference between the named forms of opercula is really so great, that there can scarcely be any doubt but that they have developed independently, and I shall here point out the significant phenomenon that a number of different forms independently and in different manner have developed a protecting roof to the hydrotheca.

I have already given my reasons why I must regard the presence of an operculum as a family character, and I shall lastly add that if we were to refer all these operculate forms to the *Lafoëidae* we should also be obliged to refer the *Sertulariidae* to the latter family.

A comparison between the diagnoses given above of the two operculate families, the *Campanulinidae* and the *Sertulariidae*, shows that they are very nearly related, and the most significant characters, which distinguish the members of the latter family, are that they are always bilaterally developed, always sessile, and as a rule have a larger or smaller part of the adcauline wall coalesced with the corresponding stem or branch. Further in all the *Sertulariidae*

---

[1]) This genus must, no doubt, be united with *Thyroscyphus*.
[2]) 30, p. 380.

the whole roof of the hydrotheca is transformed into the operculum while this within the *Campanulinidae* is only found in *Tetrapoma*, *Thyroscyphus* (with *Parascyphus*) and *Abietinella* n. g.

The interesting species for which I have found it necessary to institute the last named new genus has been described by Jäderholm[1]) under the name of *Zygophylax operculata*. Like a number of nearly related species, referred to the genera *Zygophylax*, *Perisiphonia*, *Brucella*[2]) and *Lictorella*, it possesses short-stalked, bilaterally symmetrical hydrothecae, at their base provided with one or two nematothecae, and the colony consists of an axial tube, which bears at least the great plurality of the hydrothecae, and a number of peripheral tubes. The hydranth is provided with a blind sack, which no doubt is found also in the other related species, but in opposition to the latter the hydrothecae possess quite a similar adcauline operculum to that found in the genera *Diphasia* and *Abietinaria*, being at the same time of a similar form as in the latter genus, and especially presenting a similar neck-shaped narrowing at the adcauline side. In opposition to *Zygophylax* (*Brucella*) *armata* Ritchie, the diaphragm of which is perforated by a large round opening, the diaphragm-opening of *Abietinella operculata* (pl. IV, fig. 22 a) has a similar form to that found in a number of *Abietinaria* species (pl. IV, fig. 22 b), being pear-shaped and surrounded by a projecting margin. If the proximal half of such a hydrotheca were to coalesce with the branch we should find in continuation of the line, indicating the concrescence between the hydrothecal wall and the corresponding wall of the branch, another line running downwards from the adcauline end of the diaphragma and indicating the corresponding concrescence between the stalk and the branch. Such a line, which I shall call the „stalk-mark", we find more or less developed in all the species of *Diphasia* (pl. IV, fig. 26) and *Abietinaria* (pl. IV, fig. 24), and it is distinct evidence that these species must be derived from forms, which have

[1]) 25, p. 276, Taf. 12 figs. 7—8.

[2]) 50.

been provided with a free stalk. Another species *Zygophylax grandis* Vanh., which must be referred to the same genus, has later been described by Vanhöffen.[1]) Though *Abietinaria* lacks both peripheral tubes and nematothecae the agreement between the species of this group and those of *Abietinella* in the form of the hydrothecae and the structure of the operculum is so great, that I cannot doubt but that the former genus must be derived from the latter. The presence and the development of the nematothecae in the nearly related species, referred to *Zygophylax*, *Perisiphonia* and *Lictorella*, is subject to very great variation, and the same holds good for the composition of the colony, not only in the same form-group, where the peripheral tubes have a very different extension, but also in a number of genera belonging to the *Campanulinidae* and *Sertulariidae*. I have already spoken of the differences in the form of the colony within the genus *Stegopoma*, and I shall still only mention that while the stem in the *Sertulariidae* is monosiphonic, as a rule, a small number of *Sertularella*-species possess a polysiphonic stem. The gonothecae have not yet been found in any of the two *Abietinella*-species, but it is permissible to suppose that they are arranged in the form of a Coppinia, as this arrangement has been found in the related species *Perisiphonia conferta*, *Zygophylax* (*Brucella*) *armata* and in a new species of *Zygophylax* from the Philippine Islands. As the presence of a Coppinia in a freely growing colony seems to be contingent upon the presence of peripheral tubes, the disappearance of the latter might explain the quite different arrangement of the gonothecae in *Abietinaria*, where they as in the great plurality of the *Sertulariidae* are placed in the neighbourhood of the single hydrothecae.

The short-stalked *Thyroscyphus*-species *Th.* (*Parascyphus*) *simplex* Lmx.[2]) *Th. Torresi Busk* (= *Th. simplex* Allm.[3]) and *Th. vitiensis* Markt.[4]) stand in a similar relation to *Sertularella* as

[1]) 50.

[2]) 53, p. 158.

[3]) 5.

[4]) 36, p. 210 and 9, p. 343.

Abietinella to *Abietinaria* and *Diphasia*. They only differ from species of that genus in their hydrothecae being short-stalked, and, therefore, a concretion between the stalk and the corresponding axis would convert them into *Sertularella*-species.

There has not yet been found operculate short-stalked species, corresponding to the other genera of the *Sertulariidae*, but that such forms have existed is evident from the fact, that a more or less developed stalk-mark is present in most species belonging to this family[1]) When a branch is regarded from one of the sides, this mark as a rule appears as a narrow chitinous process forming a continuation of the inner hydrothecal wall and running either downwards or obliquely inwards, but when we regard a hydrotheca from its inner, adcauline wall we see the whole stalk-mark (Pl. IV, figs. 25, 27) which is provided with a curved or sometimes angularly bent proximal margin, and, therefore, its middle part is much shorter than the two lateral margins seen from the sides of the branch. Sometimes, however, we may also be able to see the whole stalk-mark, when a branch is regarded from the outer surface, f. inst. in *Hydrallmania falcata*. (Pl. V, fig. 7.) In some species, f. inst. in *Sertularia pumila*, *Odontotheca trispinosa* and *Abietinaria Coei* the stalk-mark when regarded from the side has the form of a short coecum-like projection, and in that case the stalk must have been provided with an adcauline concavity, which has prevented it from coalescing with the branch in its whole length. In the two former species it is evident already from an outer inspection that this projection contains an inner cavity (Pl. IV, figs. 13, 15, Pl, V, figs. 11, 14), the presence of which is confirmed by means of a sagittal section through a hy-

---

1) While many authors have seen and figured the stalk-mark I have only found it mentioned by Clarke (15a) and Ritchie (51). Clarke who has seen it in *Sertularia complexa* describes it in the following way: . . .: »chitinous processes extend downwards from the base of each hydrotheca, surrounding an aperture through which the body of the polypite is connected with the cænosarc of the stem.« Ritchie who has seen it in *Sertularia heterodonta* and *S. rathbuni* mentions it in the latter species as »two chitinous processes which project downwards and lie alongside the wall of the internode.«

drotheca. It is however completely closed outwardly. Also in *A. coei* (Pl. IV, fig. 23) a number of the corresponding projections contain a distinct inner cavity, but in most of them it seems to be completely filled by a chitinous secretion.

According to the investigations contained in this paper I must maintain that the *Campanulinidae* have developed from the *Lafoëidae* or partly from the *Campanulariidae*, and that the *Sertulariidae* must be derived from that group of the *Campanulinidae* in which the whole roof of the hydrotheca has been transformed into an operculum.

Thujaria (Fleming) Lev.

The aperture is vertical or obliquely ascending and provided with an abcauline sinus, in which is fixed an opercular membrane, the distal part of which is a free valve.

The gonothecae of the species hitherto examined are smooth without transverse rings and without spines.

In most biserial species the hydrothecae are almost symmetrical, being only in a very slight degree turned towards the frontal face[1]) of the colony.

Of this genus I have examined the following species: *Th. thuja* (L.) *Th. lonchitis* (Ellis & Sol.), *Th. articulata* (Pall.), *Th. lichenastrum* (Pall.), *Th. annulata* Krp., *Th. carica* Lev., *Th. polycarpa* Pöpp., *Th. variabilis* Markt., *Th. cedrina* (L.), *Th. cupressoides* (Lepech.), *Th. sinuosa* Bale, *Th. tuba* (Bale), *Th. desmoides* (Torr.), *Th. hexodon* (Bale), *Th. juncea* (Vanh.), *Th. Hartlaubi* (Nutt.), *Th. Hincksi* (Mer.), *Th. pinnata* (Mer.), *Th. cylindrica* (Clark.).

Sertularia (L.) Lev.

Dynamena (Lamour.)

The aperture is oblique and provided with two lateral teeth, between which there are found a deeper abcauline and a lower

[1]) »Frontal« we call that face of the colony on which the gonothecae are placed.

adcauline sinus, the latter of which is in most cases divided int two lateral halves by means of a median projection. In each sinu is fixed an opercular membrane, the abcauline of which is in mos species provided with a free distal valvular portion.

The gonothecae present a very different habitus, being eithe smooth, ringed or provided with two or more spines.

In most biserial species the aperture is distinctly turned toward the frontal surface.

In the large plurality of the species the adcauline sinus divided into two lateral halves by means of a more or less deve oped median projection. In all such cases the adcauline membrar is at the same time more or less distinctly angularly bent fro side to side, the ridge of the membrane rising from the media projection. In all such cases the abcauline membrane is provide with a free, triangular, valvular portion, fitting into the ang formed by the adcauline membrane, and the length of this portio depends on the development of the median projection and the si of the angle in such a manner, that a more developed medi projection gives a smaller angle and a longer valvular portio In such species as f. inst. *S. argentea* L, S. *mirabilis* (Ver and *S. Birulae* Schydl.[1]) the median projection and the angul bending of the adcauline membrane are only feebly developed whi they are well-developed in *S. pumila* and in all such species, which the hydrothecae of each pair are contiguous on the fron side of the colony. Such species are f. inst. *S. Versluysi* Nu e. t. c.. A still larger development is attained in *S. tubuliform* (Markt.[2]) in which species the median projection has the sar length as the lateral teeth, and the adcauline membrane is at lea of the same size as the abcauline. When a closed hydrotheca such a species is regarded from the side, the ridge of the adcauli membrane forms an obtuse angle with the adcauline wall, a when regarded from the frontal surface its opercular apparat might seem to be composed of three valves, two adcauline and

[1]) 55.
[2]) 36.

abcauline. In such a manner the opercular apparatus of *S. Rathbuni* has been interpreted by Nutting[1]) and Ritchie[2]), and that of *S. heterodonta* by the latter author[2]), but the supposed two distal valves are really only the two halves of the angularly bent adcauline membrane.

I have already pointed out that Nutting regards the opercular apparatus in *Sertularia* as "shaped like the side walls of an "A" tent, the front and rear of the tent being closed by the two opposite hydrothecal teeth", and as a typical example he describes the development and structure of the operculum in *S. pumila.* At the same time, however, Nutting's figures of *S. cornicina, S. Mayeri, S. brevicyathus* and *S. flowersi* distinctly show that the operculum in these species cannot be constructed in the above manner, the aperture being provided with an adcauline median projection and an angularly bent adcauline wall In such of the author's figures which present the hydrothecae regarded from the side, as f. inst. those of *S. Pourtalesi*[1]) and *S. exigua*[1]), only the one lateral half of the angularly bent adcauline membrane is seen. I have seen, however, a few species, in which the operculum is constructed in the manner described by Nutting, and that is the case in *S. Suensoni* n. sp. (pl. IV, figs. 16—20), *S. grisea* Krp. (= *S. similis* Clark), and in that form which Marktanner-Turneretscher[3]) has described under the name *S. diffusa* Allm., var. To judge from the figure given by the author *Sertularia (Sertularella) Clarki* Mer. seems to have a similar operculum. In these species the adcauline sinus has no median projection, the adcauline membrane is not angularly bent, and both opercular membranes, which have an almost straight free edge, form with each other an acute angle. An adcauline median projection and an angular bending of the adcauline wall we also lack in *S. Nuttingi* n. sp. (pl. IV, figs. 1—4) in which the bottom of the sinus is convex aud the adcauline membrane very short. The same

---

1) 44.
2) 51.
3) 36.

is the case in the nearly related species *S. intermedia* (pl. IV, figs. 7—10) in which, however, the lateral teeth are less developed, and the adcauline membrane only indistinctly defined from the rest of the adcauline wall. I must regard both species as intermediate forms between *Thujaria* and *Sertularia*, and I cannot doubt but that the latter genus has developed from the former by a transformation of the distal part of the adcauline wall.

Sertularia Suensoni n. sp.

(pl. IV, figs. 16—20).

The colony, the height of which is 67 mm, has a thin, but rather rigid geniculate stem, which increases in thickness towards the tip, and is divided into distinct internodes, each of which bears a branch. The branches, which rise from the stem at an angle of about 70°, present a spiral arrangement, the sixth being placed over the first. They are regularly and richly dichotomously branched, each being divided 7 times, and, therefore, they form a very dense tuft, which in the colony examined takes up the distal half, the branches in the proximal half being only represented by a few proximal internodes. The internodes of the branches bear 5—13 hydrothecae.

The hydrothecae, the length of which is c. 0,5 mm, are alternate or subalternate, provided with a short free, obliquely ascending, not outwardly curved distal end, and divided from each other by interspaces which increase in length towards the end of the branches, where they may attain the length of a hydrotheca. The aperture, which is turned a little towards the frontal surface of the colony and is provided with two large, triangular lateral teeth, has a concave adcauline sinus without a median projection, and the adcauline membrane, which is not angularly bent and slopes a little outwards has an almost straight free edge, which meets the corresponding edge of the abcauline membrane at an angle of c. 50°. In opposition to what is found in the large plurality of *Sertularia*-species the abcauline membrane, therefore, has no free valvular

portion, and the egress of the hydranth takes place only through the fissure between the edges of the two membranes. In this species, therefore, the opercular apparatus is formed as the walls of an "A" tent.

A single colony was taken at lat. 42° N, long. 130° 30′ E. by Capt. E. Suenson. Depth 60 fathoms.

This species is nearly related to *S. Fabricii* Lev. which also lacks a median adcauline projection, but in the latter species the adcauline membrane is not sloping outwards, and being, besides, slightly convex from side to side the abcauline membrane is provided with a feebly developed free valvular portion.

Sertularia decipiens n. sp.

(Pl. IV, figs. 11, 12).

The colonies, the largest of which attains a height of 22 mm, are singly pinnate with alternate branches, and the stem is divided into regular internodes, each of which as a rule bears a single branch. An exception is found in the lowermost branchiferous internode which always bears two opposite or subopposite branches, and in a small number of the colonies examined the same is the case with still another internode, in a single colony even with two. While the furrows dividing the single internodes from each other are as a rule sloping very little towards the frontal surface of the colony, those bounding the proximal end of the internodes with two branches are very different from the others, being very long and deep and the two lateral halves of each forming with each other two acute angles of about 35°—40°, a distal on the dorsal and a proximal on the frontal surface of the colony. The lowermost non-branchiferous portion of the colony has the length of 3—4 internodes, and as a rule is not divided into distinct internodes, but in a small number of the colonies the distal end presents 1—2 short internodes, the proximal end of which is bounded by similar characteristic furrows as those above mentioned. The branches, of which the largest colonies bear 8—9 on each side,

are divided into internodes of different length, each bearing 1—4 pairs of opposite hydrothecae, and as a rule the internodes of the proximal half of the branch have a larger number of hydrothecae than those of the distal half, in which, therefore, most of the short internodes are found.

The hydrothecae, which are placed on the frontal side of the colony, are adnate to the stem and the branches with a portion of their adcauline wall which rarely attains the half length of the latter. Besides, the hydrothecae of each pair are contiguous in the two thirds of their length and the single pairs of hydrothecae belonging to the same internode are connected with each other in such a way, that a larger part of the adcauline wall of a proximal hydrotheca is adnate to a smaller part of the abcauline wall of a distal hydrotheca. They are elongately vase-shaped, and their free distal ends are turned obliquely outwards, those belonging to each pair of hydrothecae forming with each other an angle of c. 70°. The aperture is twice as broad as high and provided both with well-developed lateral teeth and with a well-developed median projection, which divides the adcauline sinus into two lateral halves. There is found a well-developed, outwards sloping, angularly bent adcauline membrane.

Each branchiferous internode of the stem is provided with a pair of subopposite hydrothecae, which in the proximal part of the stem are divided from each other by an interstice, the breadth of which gradually decreases distally according to the decreasing breadth of stem, and at last they coalesce with each other in a similar way as in the branches. Sometimes this coalescence may take place already in the fourth internode, sometimes not before the seventh. Besides there is found a single hydrotheca distally to each branch. In most colonies more or less of the proximal stem internodes have lost their hydrothecae which, however, have left distinct traces of their presence.

Of this species I have seen 70 colonies which rise from an interlacing stolonic network, fixed to a worm-tube. Paumben (India). Depth 1 fathom. (C. Fristedt).

Both the form of the hydrothecae and their unilateral arrangement give to this species a great outer resemblance to *Hydrallmania falcata*.

Sertularia Nuttingi n. sp.

(Pl. IV, figs. 1—4).

The colonies, the largest of which has a height of 117 mm, have a thin slender stem, which is as a rule only indistinctly divided into internodes, but in some of them the internodes of the distal part are rather distinct and each provided with 3 branches. In the youngest colony, which has a height of 50 mm. and is provided with 15 pairs of alternate branches, the stem has very distinct internodes which are provided with 4—8 branches. We can discern in the colony between a proximal, somewhat longer part, in which the branches are simple and alternate, and a distal part, the branches of which are composite and spirally arranged, the sixth being placed over the first. The latter branches are provided on each side with 1—3 alternate branchlets, a few of which may rarely be bifurcate. The branches diminish in length towards the end of the branch, and as they have their ends lying in the same circle-segment these branches look as if they were flabellate. The simple branches and the longest branchlets are only divided into two, rarely three internodes.

The hydrothecae, which are alternate, show some difference in the proximal and in the distal portion of the colony, being in the former wholly adnate and provided with an almost vertical or very little ascending abcauline wall, while in the latter they have a very short, free distal end and a distinctly ascending abcauline wall. While further the single hydrothecae in the former are nearly approximate, they are in the latter divided from each other by an interstice which may attain the half length of the hydrotheca. The above differences, however, are not equally large in all colonies, and, besides, there may be found some difference, also between the hydrothecae in the proximal and those in the

distal part of the branches. The aperture, which is turned a little outwards and frontally, is provided with two well-developed roundedly triangular lateral teeth and lacks an adcauline median projection. The bottom of the adcauline sinus is convex, and the short adcauline membrane is convex from side to side.

The gonothecae are pyriform, smooth, and the short annular aperture is surrounded by 6—8 short spines.

Of this species I have seen 8 colonies from Japan (33° 10′ N. 129° 18′ E.), depth 33 fath. (Schönau).

Sertularia intermedia n. sp.

(Pl. IV, figs. 7—10).

The colony, which has a height of 95 mm. is provided with a thin slender stem, presenting a number of indistinct internodes with 6—12 branches. It is divided into a proximal half with simple alternate branches, and a distal half, the branches of which are spirally arranged and composite, each being provided on each side with 3—5 branchlets, which gradually decrease in length towards the tip, and, therefore, these branches give the impression of being flabelliform.

The hydrothecae which are alternate and divided from each other by an interstice, which may attain the length of a half hydrotheca, are in the whole length of the colony provided with a distinctly obliquely ascending and gracefully outwards curved abcauline wall, and with a rather short free distal end. The aperture which is turned directly towards the margin of the colony, is provided with two broadly rounded, but low lateral teeth, and with a convex or indistinctly angularly bent adcauline wall, the membranous portion of which is very low and indistinctly defined.

The gonotheeae are pyriform, and the short ring-shaped aperture is surrounded by 6—8 short spines. Besides the above described mature colony there are found two small (height 32—

40 mm) pinnate ones, provided with 12—15 pairs of alternate branches.

From the Korea-Strait (Capt. E. Suenson). Depth 50 fath.

Hydrallmania (Hincks) Lev.

The aperture is provided with two lateral teeth between which are found a deeper adcauline and a much lower abcauline sinus, which is not divided by a median projection. The opercular apparatus is formed by a much larger adcauline and a small abcauline membrane, the former of which is provided with a free valvular portion (Pl. V, figs. 1—7).

I have already pointed out[1]) that the characters on which Hincks has instituted the genus *Hydrallmania* are only of specific value, and, therefore, the question if the genus has a right to stand depends on whether the aperture and the opercular apparatus present sufficiently great differences from those found in the other genera. The above diagnosis shows that the aperture may be regarded as an inverse *Sertularia*-aperture, and, therefore, there may be set forth reasons both pro and contra the independence of the above genus, which, for the present I propose to keep. Besides the three species, *H. falcata* L., *H. distans* Nutt.[2]) and *H. fransiscana* Trask[2]), all of which have their bases placed in the same longitudinal belt and only differ from each other in minor details regarding the form and mutual position of the hydrothecae, I must to this genus still refer the species which Allman has described as *Thujaria plumulifera*.

Hydrallmania plumulifera (Allman).

Thujaria plumulifera Allman, Memoirs Mus. Comp. Zoology Vol. V, No. 2, Cambridge 1877, p. 27, pl. XVII, figs. 3—6.
— — Jäderholm, Bihang till K. Svenska Vetensk. Akadem. Handl. B. 21, Afd. IV, No. 6, 1896, p. 12, Taf. II, fig. 4.

---

[1]) 33.
[2]) 44.

non *Thujaria plumulifera* Nutting, The Sertularidae, p. 67, pl. IX, figs. 9—13.

(Pl. V, figs. 1—6).

The colony is provided with an extremely thin and slender stem, divided into distinct internodes, each of which bears a branch, but while a number of the proximal branches are alternate, simple, and rather short (length 8—10 mm), the rest of the branches, which are borne by very long internodes, are spirally arranged, much longer (19—30 mm) and each provided with 4—7 pairs of alternate branchlets. Their axes are like the main-stem divided into distinct internodes, a few of which may be without branchlets.

The hydrothecae, which are provided with a convex adcauline and a somewhat concave abcauline lateral margin, are turned outwards and more or less frontally, but in opposition to what is the case in *H. falcata* (Pl. V, fig. 8) not only their distal ends, but also their bases are in the single branchlets arranged into two distinct longitudinal series, and the single hydrothecae of a branchlet either do not touch each other at all or only in a very small degree, a small proximal and adcauline portion of a distal hydrotheca being in connection with or covered by a proximal one. For the rest they are very like those of *H. falcata*, and their distal fourth is freely projecting.

The distance between the hydrothecae of the two series as also their direction varies according to their place in the branchlet, in such a way that the more proximally the hydrothecae are placed the greater is the distance between the two series, and the less distinct is the frontal turning of the hydrothecae. A corresponding difference is also contingent upon the more or less proximal or distal position of the branchlet in the branch, and of the branch in the stem, and, therefore, the distance between the two series of hydrothecae attains its maximum in the proximal part of the proximal branches, and here the frontal turn of the hydrothecae is almost imperceptible. A line dividing one of these branchlets into two lateral halves, in the distal end only cuts off a small

adcauline portion of the diaphragms. Each branchlet is divided into 3—6 internodes, each of which bears 3—10 hydrothecae, the number of the latter in each internode decreasing as a rule towards the distal end. In the stem as also in the axes of the composite branches the hydrothecae are arranged into two well-divided longitudinal series, but while the internodes of the proximal portion of the stem bear 3 hydrothecae those of the distal portion are only provided each with a single one, placed at the origin of the branch. The axial internodes of the composite branches bear 3—6 hydrothecae.

The gonothecae, of which I have seen a few borne by the stems and by the proximal part of a number of branchlets, are elongate, smooth, from the middle decreasing in thickness towards both ends, the distal of which is somewhat tubiform.

Georgia from off the mouth of the river Savannah. Depth 4 fathoms.

I have examined two incomplete colonies sent me from the Zoological Museum of Upsala[1]).

Allman's short and incomplete description as also his accompanying figures agree very well with the present species, and the only disagreement is that according to Allman "the hydrothecae are adnate for nearly their whole length", but this difference may very well be the result of variation. The author especially points out that "*Thujaria plumulifera* has a good deal of the habit of *Hydrallmania falcata*." On the other side Nutting's species, of which he has sent me some fragments, is not identical with Allman's. It is a *Sertularia*, the hydrothecae of which are provided with a rather long, free distal portion and have the adcauline sinus feebly divided into two lateral halves. In opposition to what is the case in *H. plumulifera* there is no spiral arrangement of the branches, and the internodes which are not sharply divided from each other and each of which bears a branch, are of very unequal length, each bearing 3—15 hydrothecae.

---

[1]) I have later received a fragment of the original specimen from the Museum of Comp. Zoology, Cambridge.

I propose to name this species, the examined fragments of which are from the Albatross' station 2015, **Sertularia extensa** n. sp.

In some young colonies of *H. falcata* from Hellebaek, Denmark, which have a length of 29 mm I have also found a proximal portion with shorter internodes and provided with 8—13 pairs of rather short alternate branches, but these internodes differ from the corresponding in *H. plumulifera* therein, that they are only provided each with an axillary hydrotheca. In the youngest of these colonies the distal portion, which bears a few rudimentary branches, has a length of 10 mm.

To the present genus may perhaps still be referred *Sertularella limbata* Allm.[1]).

Odontotheca n. g.[2]).

The aperture is provided with two strongly developed, sometimes unequal abcauline teeth, between which there are found a much larger and deeper adcauline and a much smaller abcauline sinus. In each sinus is fixed a thin opercular membrane, which ends in a straight edge, and, therefore, lacks a free valvular portion. In a few cases there is found a median adcauline tooth, and in such species (f. inst. in *O. trispinosa* Cought) the adcauline membrane is angularly bent, and the abcauline provided with a free valvular portion. The gonothecae have a very variable habitus, being either smooth, ringed or provided with two spines.

To this genus I must refer the following species: *Sertularia operculata* L. (22.), *S. aperta* Allm. (4.), *S. minima* d'Arcy Th. (4.), *S. unilateralis* Allm. (4.), *S. crinis* Allm. (4.), *S. crinoidea* Allm. (4.), *S. megalocarpa* Allm. (4.), *S. bispinosa* Gray (7.), *S. Maplestonei* Bale (7.), *S. macrocarpa* Bale (7.), *S. pulchella* d'Arcy Th. (7.), *S. bidens* Bale (7.), *S. trispinosa* Cought (7.), *Sertularella trochocarpa* Allm. (4.), *Sert. episcopus* Allm. (2.), *Sert. rectitheca* Ritchie (50.), *Thujaria ramosissima* Allm. (4.), *Th. plumosa* Clark (44.) and *Abietinaria greenei* (Clark) (44.).

---

[1]) 4. [2]) Pl. V, figs. 8—15.

I have only been able to examine the opercular apparatus of *Sert. operculata* (Pl. V, figs. 8—10) and *Sert. trispinosa* (Pl. V, figs. 11—15), but the form of the aperture in the above species leaves no doubt that they must be referred to the same genus. In *Thujaria bidens* Allm. (2.) the aperture seems to be an inverted *Odontotheca*-aperture, and this species must, therefore, no doubt, be referred to a new genus.

Diphasia (Agassiz) Lev.

The aperture, which is horizontal or very little oblique, has no teeth and is provided with an adcauline sinus in which is fixed an opercular membrane with a large free opercular valve.

The above genus not only comprises most species referred to *Diphasia* but also those belonging to *Abietinaria* Kirchenpauer, a genus based solely on the form of the hydrothecae which have been characterized by the author in the following manner: „es sind flachenförmige, bauchige, mit ihrer Basis angewachsene Behälter, deren nach aussen gerichtete Öffnung das Ende eines engen, mehr oder weniger langen, nach einer Seite geliegenen Halses bildet.“ Nutting who accepts *Abietinaria* as an independent genus next to *Diphasia* characterizes it not only by the form of its hydrothecae (“more or less bottle-shaped’) and gonothecae, but also by the presence of an adcauline operculum, while Broch[2]) proposes to divide the genus *Diphasia* into two subgenera *Eudiphasia* and *Abietinaria.* As both the form of the hydrothecae and the structure of the gonothecae are subject to great variation, and the same forms of hydrothecae and of gonothecae are found in a number of different genera, I cannot regard *Abietinaria* as a distinct genus, and I think that we may, at least provisionally, accept Broch's proposition to divide *Diphasia* into two subgenera or groups.

---

1) 28.
2) 13.

Group **Eudiphasia** (Broch).

The hydrothecae increase in breadth towards the distal end, and attain their largest breadth at the aperture. The gonothecae are always provided with a number of projections (leaves, spines), of different form and size, either placed in the distal end or spread over a larger portion of the gonotheca.

To this group belong the following species: *D. rosacea* (L.) (22.), *D. attenuata* Hincks (22.), *D. fallax* (Johnst.) (22.), *D. Wandeli* Lev. (32), *D. pinaster* (Ell.-Sol.) (22.), *D. pinnata* (Pall.) (22.), *D. alata* Hincks (= *Thuj. pharmacopola* Allm.) (22.), *D. paarmani* Nutt. (44.), *D. palmata* Nutt. (45.), *D. tropica* Nutt. (44.), *D. bipinnata* Allm. (4.), *D. scalariformis* Kirkp. (29.), *D. mutulata* (Busk) (7.), *D. digitalis* (Busk) (7.) = *Desmoscyphus acanthocarpus* Allm. (5.) and possibly *Thuj. heteromorpha* Allm. (4.).

Group **Abietinaria** Kirchenp.

The hydrothecae decrease in breadth towards the distal end, and the breadth of the aperture is smaller — as a rule much smaller — than the largest breadth of the hydrotheca. The gonothecae are smooth or ringed, and rarely provided with two spines.

Besides the 10 species, referred by Kirchenpauer to his genus *Abietinaria*, I also refer the following species to this group: *A. coei* Nutt. (44.), *A. Traski* Torr. (44.), *A. amphora* Nutt. (44.), *A. gracilis* Nutt. (44.), *A. costata* Nutt. (44.), *A. annulata* (Krp.) (44.), *A. turgida* (Clark) (44.), *A. gigantea* (Clark) (44), *Diphasia Kincaidi* Nutt. (44.), ? *D. pulchra* Nutt. (44.), (= *Dynamena unilateralis* Bonnevie (12, p. 78), *Thuj. thujarioides* (Clark) Nutt. (44.) and *Sertularia* (*Selaginopsis*) *fusca* Johnst. (= *Th. salicornia* Allm.) (1.). Lastly I shall set forth some few remarks on the structure and synonymy of a number of the above species.

In a number of them I have found an internal, median, adcauline tooth-shaped projection of different form and size, which is placed a little proximally to the free edge, and only seems to be present in such forms in which there is a well-developed ad-

cauline collar-like narrowing. This projection has been found in *A. Tilesi*, *A. melo*, *A. costata*, *A. juniperus*, *A. filicula*, *A. coei*, (Pl. IV, fig. 22), *A. gracilis* and in those forms which Kirchenpauer has designated as *A. abietina*, var. *minor*, *A*, *abietina*, var. *purpurea* and *A. filicula*, var. *tornata*.

In *A. Traski* the diaphragm is on each side provided with a triangular, pointed, ascending portion.

Thujaria salicornia Allman,[1]) which, as far as I know, has not been mentioned since it was described, is identical with *Sert. fusca* Johnst., and the reason why this fact has not been earlier detected is, no doubt, that the hydrothecae look very different in the figures given by Hincks and in those given by Allman. The pinna figured by Hincks is namely seen from one of the broad sides, while the two pinnae figured by Allman are seen from one of the narrow sides.

Broch regards *Diphasia pulchra* Nutt. as a synonym to *Thuj. thujarioides* (Clark), and the two forms, which have quite similar gonothecae, are no doubt nearly related, but a comparison between specimens of both has led me to the result, that they must be regarded as distinct species. I shall here only point out that in *A. pulchra* the very short free distal portion of the hydrothecae, which is provided with an adcauline collar-like narrowing, is only by a very narrow interspace divided from the adjacent portion of the branch, while in *A. thujarioides* the much longer distal portion has no narrowing and is divided from the stem by a rather broad and deep sinus.

The abcauline wall of *Diph. digitalis* (Busk) presents a feebly developed membranous collar, and, therefore, the aperture is provided with two feeble lateral teeth.

Sertularella (Gray) Hincks.

The aperture is provided with 3—4 marginal teeth, between which are found as many curves. In each curve is fixed an opercular membrane provided with a large free, valvular portion.

---

[1]) 1, p.

In the large plurality of species the gonothecae are ringed; and with the exception of a single species (*S. tamarisca*) the hydrothecae are regularly alternate.

As in most genera the form and direction of the hydrothecae are subject to great variation, but in opposition to what is found in more or fewer species of all the other genera, the turning of the hydrothecae towards the frontal surface of the colony is never so strong that the hydrothecae of the two opposite series come in contact with each other, and this cannot be regarded as a consequence of the alternate arrangement of the hydrothecae, as such a coalescence is found both in *Hydrallmania* and in *Idia*, the hydrothecae of which are alternate.

In opposition to what is found in all other genera with many species the arrangement of the hydrothecae is exceptionally constant, opposite hydrothecae having hitherto only been found in *S. tamarisca*.

In respect to the extent in which the hydrothecae are adnate to the respective axis *Sertularella* is the only genus, in which a number of species have their hydrothecae only affixed by their bases (*S. quadrata* Nutt., *S. catena* Allm., *S. cylindritheca* Allm., *S. magna* Nutt.), and, besides, in a large number of species the adcauline wall of the hydrothecae is only adnate in its proximal third or fourth (f. inst. in *S. areyi* Nutt., *S. amphoriformis* Nutt., *S. fusiformis* Hincks, *S. tricuspidata* (Alder) e. t. c.), a condition which outside the genus *Sertularella* has only been found in a few species of the subgenus *Abietinaria*. Only in a few species (*S. lata* Bale, *S. distans* Allm., *S. albida* Krp.) are the hydrothecae adnate in their whole length.

Corresponding primitive conditions are also presented by some species in the structure of the diaphragma, and by others in the composition of the colony.

While all other members of the family seem to possess a complete diaphragma perforated by a narrow abcauline, pearshaped or ovate opening, the diaphragma in a number of *Sertularella*-species

is more or less incomplete, and in *S. lata* (Bale) and *S. distans* Allm. it is quite absent, being only represented by the somewhat thickened proximal edge of the adcauline hydrothecal wall. In *S. magna* Nutt. and *S.* (*Thecocladium*) *flabellum* Allm. it is only developed as a narrow adcauline belt, while in *S. qvadrata* Nutt. and *S. cylindritheca* Allm. a corresponding belt is found in the whole circumference of the hydrotheca. It is broader in the dorsal than in the frontal surface of the colony, and, in the old hydrothecae of the stem I have found it closed with the exception of a round or pear-shaped opening. In a number of species I have found the diaphragma perforated by an unusually large rounded opening, for inst. in *S. pinnata* Clark, *S. tricuspidata* Alder, *S. fruticolosa* Til., *S. Tilesii* Krp., und *S. infracta* Krp. A large ovate opening is found in *S. tamarisca.*

While a fascicled stem is so common a feature in the *Lafoëidae*, the *Campanulariidae* and the *Campanulinidae*, it very rarely occurs in the *Sertulariidae* outside the genus *Sertularella*, namely in *Diphasia alata* Hincks, "*Thujaria*" *diaphana* Allm., *Thujaria bidens* and *Sertularella cuneata* Allm.; but it has been found in the following *Sertularella*-species: *S. gayi* (Lmx.), *S. megastoma* Nutt., *S. catena* Allm., *S. pinnigera* Hartl., *S. tropica* Nutt., *S. pluma* Krp., *S. arborea* Krp., *S. crassicaulis* Heller. *S. antarctica* Hartl. *S. annulata* Allm. and *S. crassipes* Allm.

Short-stalked hydrothecae have been found in the creeping *Sert.* (*Calamphora*) *parvula* Allm.,[1]) and in a form which Hartlaub has provisionally designated as *Sert. tenella* (?).[2]) I think the hydrothecae of the latter are much more like those of *Sert. Areyi* Nutt.[3]).

The above facts, therefore, seem to show that *Sertularella* is the most primitive genus in the family *Sertulariidae*. Lastly, we must still mention that though the large plurality of the gonothecae in *Sertularella* are ringed, the two other forms, which have been

[1]) 5.

[2]) 19, p. 64, pl. V, fig. 24.

[3]) 44, p. 83.

found in most genera, namely, the smooth and the spinous ones are also represented in this genus. Hartlaub names five species, in which the gonothecae are smooth while spinous gonothecae have only been found in *S. quadrata* Nutt., *S. turgida* (Trask) and *S. tamarisca.*

As the large plurality of the *Sertularella*-species are provided with a stalk-mark, there can be no doubt that they have developed from stalked forms, and as the hydrothecae in the genus *Thyroscyphus* are provided both with a stalk and with a *Sertularella*-operculum, it is permissible to suppose that a large number of these ancestral forms have been short-stalked *Thyroscyphus*-species. I have found the gonothecae of *Th. ramosus* Allm. and *Th. Torresi* Busk, in which two species they are indistinctly ringed, and therefore they present no difficulty to such a supposition. Neither does the diaphragma, which is developed as a marginal thickening in the whole circumference of the hydrotheca and, therefore, corresponds to the thickened marginal portion of the diaphragma found in most *Sertularella*-species. But such species as *S. lata* (Bale), *S. distans* Allm., *S. magna* Nutt. and *S. flabellum* (Allm.), in which the diaphragma is either quite absent or only represented by a narrow adcauline belt cannot have developed from *Thyroscyphus*, and the same, no doubt, holds good also for the earlier mentioned group of species, the cylindrical hydrothecae of which are free in their whole length, but quite lack a stalk-mark. To *Sertularella* have also been referred a small number of species provided with free cylindrical hydrothecae, but without an operculum, namely "*Sertularella*" *integritheca* Allm., "*Sertularella*" *formosa* Fewkes and "*Sertularella*" *Hartlaubi* Nutt. In "*S.*" *integritheca*, the only one of the three species, which I have been able to examine, the diaphragma has a somewhat similar structure as in "*S.*" *cylindritheca*, and I am inclined to think, that the same is the case, with the two other species. I cannot refer the three species to *Sertularella* as they lack the chief character of this genus, but it is possible that the *cylindritheca* group may have developed from the

integritheca group by the transformation of the hydrothecal roof into an operculum. In either case I cannot doubt but that *Sertularella* is a polyphyletic genus.

Idia Lamouroux.

(Pl. V, figs. 18—22).

The obliquely ascending aperture is surrounded by two very thin lips, which are bordered on each side by a small tooth, and are provided with a very much convex free margin. While the presence of an abcauline opercular membrane is only faintly indicated on each side by the bounding of the lateral tooth, there is found a large, well-defined adcauline sinus, which is divided into two lateral halves by a well-developed median tooth, and the adcauline opercular membrane, which is provided with a median fold and with a free valvular portion, is in opposition to the abcauline lip very movable.

In the only species hitherto known the two series of subalternate hydrothecae are with the exception of the outwards bent distal ends, in the pinnules (but not in the stems) aduate to each other along the frontal surface of the colony. The gonothecae are urn-shaped, and with the exception of the short broad aperture their surface is divided into a number of longitudinal belts.

In the structure of the hydrothecal margin and the opercular apparatus this genus presents the greatest likeness to *Hydrallmania,* but it differs from this genus in the possession of a median adcauline tooth, and therein that an abcauline opercular membrane is only faintly indicated by the abcauline bounding of the lateral teeth.

Also in the possession of subalternate hydrothecae, and in the more or less extensive coalescence, which takes place between the two opposite series, the species of *Hydrallmania* show likeness to *Idia pristis.*

Allman[1]) who has misunderstood both the structure of the

---

[1]) 5.

opercular apparatus, and the composition of the colony has referred the genus *Idia* not only to an independent family, but also to a new section *Thalamophora*. A correct description of the colony has been given by Bale[2], and Billard[3]) has pointed out the presence of an adcauline operculum.

Plate IV.

Fig. 1. *Sertularia Nuttingi* n. sp. Hydrothecae from the distal portion of the colony. Frontal surface. × 57.
— 2. The same species. Distal portion of the colony. Dorsal surface. × 47.
— 3. The same species. The distal end of a hydrotheca, seen from the frontal surface. × 66.
— 4. A gonotheca of the same species. × 34.
— 5. The distal end of a hydrotheca of *Sert. Fabricii* Lev., seen from its frontal surface. × 47.
— 6. The distal end of the same hydrotheca, seen from the side. × 47.
— 7. *Sertularia intermedia* n. sp. Hydrothecae from the distal portion of a colony. × 34.
— 8. The same species. The distal end of a hydrotheca, seen from its frontal surface. × 66.
— 9. The same species. The one side-half of the distal end of a hydrotheca, extended. × 66.
— 10. A gonotheca of the same species. × 34.
— 11. *Sertularia decipiens* n. sp. A portion of a branch, seen from the side. × 20.
— 12. The same species. A portion of a branch. Front view. × 20.
— 13. *Sertularia pumila* L. A pair of hydrothecae showing distinct stalks, and distally to each of them a translucent inner cavity. Trondhjem-fiord. × 34.
— 14. The same species. Frontal view of the end of a hydrotheca × 66.
— 15. The same species. Longitudinal section through a portion of a hydrotheca showing the stalk and the inner cavity between the latter and the hydrotheca. × 47.
— 16. *Sertularia Suensoni* n. sp. A portion of a branch. Front view. × 34.

---

[2]) 7.
[3]) 9.

Fig. 17. The distal end of a hydrotheca from the abcauline surface. × 66.
— 18. The distal end of a hydrotheca from the adcauline surface. × 66.
— 19. The distal end of a hydrotheca showing the "A"-tent, formed by the two opercular membranes.
— 20. The "A"-tent seen from above. × 66.
— 21. *Abietinella operculata* (Jäd.). × 34.
— 22 a. The diaphragm of the same species. × 66.
— 22 b. The opening of the diaphragm in *Abietinaria Traski.* × 66.
— 23. A hydrotheca of *Abietinaria coei* Nutt. showing the stalk-mark and the adcauline internal tooth. × 34.
— 24. A hydrotheca of *Abiet. abietina* L. showing the stalk-mark. × 20.
— 25. Two hydrothecae of *Abiet. variabilis* after their abcauline projecting portion has been cut away. Distally is seen the boundary line of the adcauline hydrothecal wall, and proximally the diaphragm, the aperture of which is surrounded by a projecting margin, and the stalk-mark. × 20.
— 26. A hydrotheca of *Diphasia pinaster* L, with stalk-mark. × 20.
— 27. A hydrotheca of the same species after its abcauline projecting portion has been cut away. Proximally are seen the stalk-mark and the diaphragm.
— 28—29. *Sertularella magna* Nutt. The distal end of a hydrotheca seen from the opposite sides. × 66.

Plate V.

Fig. 1. *Hydrallmania plumulifera* Allm. A portion of a proximal branch. Dorsal view. The hydrothecae, which show distinct stalk-marks, have been regenerated. × 34.
— 2. The same species. A portion of a distal branch. Frontal view. × 34.
— 3. The same species. A portion of a distal branch. Lateral view. Distinct stalk-marks. × 34.
— 4. The distal end of a hydrothecae, seen from the abcauline surface. × 66.
— 5. The distal end of a hydrotheca, seen from the side. × 66.
— 6. The distal end of a hydrotheca, seen from the adcauline surface. × 66.
— 7. *Hydrallmania falcata* (L,). A portion of a branch. Lateral view. Distinct stalk-marks. × 34.
— 8. *Odontotheca operculata* (L.). A portion of a branch. Frontal view. Distinct stalk-marks. × 34.
— 9. The same species. The Distal end of a hydrotheca, seen from the abcauline surface. × 66.
— 10. The distal end of a hydrotheca, seen from the adcauline surface and partly from above. The translucent abcauline sinus is seen. × 66.

Fig. 11. *Odontotheca trispinosa* Cought. A pair of hydrothecae, seen from the frontal surface of the branch. The stalk-mark shows a translucent inner cavity. × 47.

— 12—13. The same species. The distal end of a hydrotheca, seen in two slightly different positions, but mainly from the adcauline surface and partly from above. In fig. 13 is seen the translucent abcauline sinus. The line springing from the adcauline tooth indicates the ridge of the angularly bent adcauline membrane. × 66.

— 14. An optical longitudinal section of a hydrotheca showing the inner cavity of the stalk-mark. × 75.

— 15. The same species. A hydrotheca seen from the abcauline surface. Distally is seen the abcauline opercular membrane. For the rest compare with Pl. IV, fig. 24. × 47.

— 16. A gonotheca of *Hebella contorta* Markt. × 34.

— 17. The same gonotheca seen from the distal end. × 34.

— 18. *Idia pristis* Lmx. A portion of a branch seen from the frontal surface. Near to the distal end of each hydrotheca is seen the fold of the adcauline opercular membrane (also seen in the other figures). × 34.

— 19. The same species. Dorsal view. Distinct stalk-marks. × 34.

— 20. The same species. A somewhat oblique longitudinal section, which has cut away the distal ends of the one series of hydrothecae. Distinct stalk-marks. × 34.

— 21. The same species. The distal end of a hydrotheca, seen from the adcauline surface. × 66.

— 22. The same, seen from the abcauline surface. The presence of a special abcauline opercular membrane is only faintly indicated. The adcauline sinus with its median projection is seen through the thin wall. × 66.

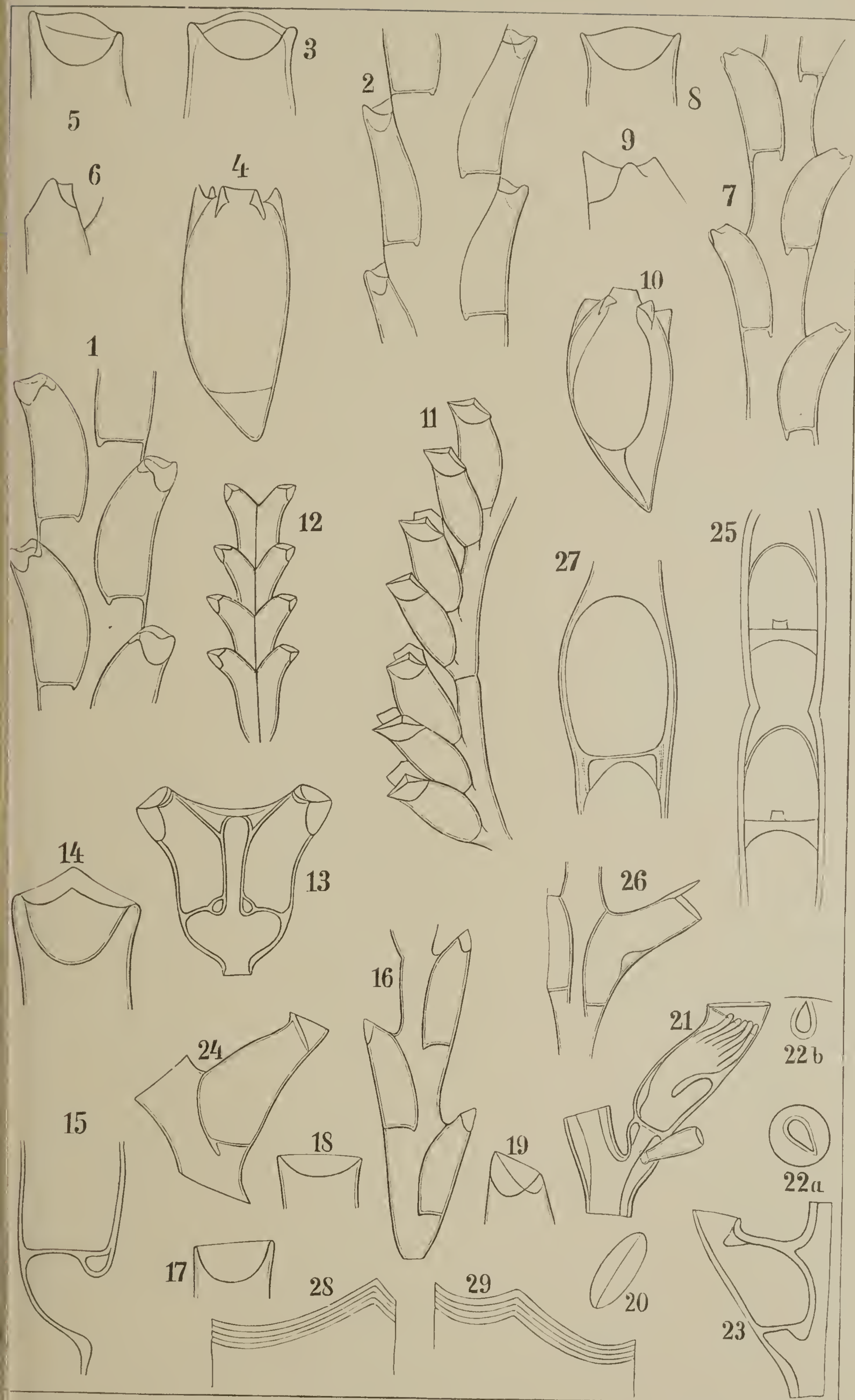
Literature.

1. Allman, G. J.: Report on the Hydroida collected during the expeditions of H. M. S. "Porcupine" (Transactions of the Zoological Society of London, vol. VIII, part. VIII, 1874, pag. 469—481, pls. 65—68).

1 a. — A monograph of the Gymnoblastic or Tubularian Hydroids (Ray Society, London, 1871).

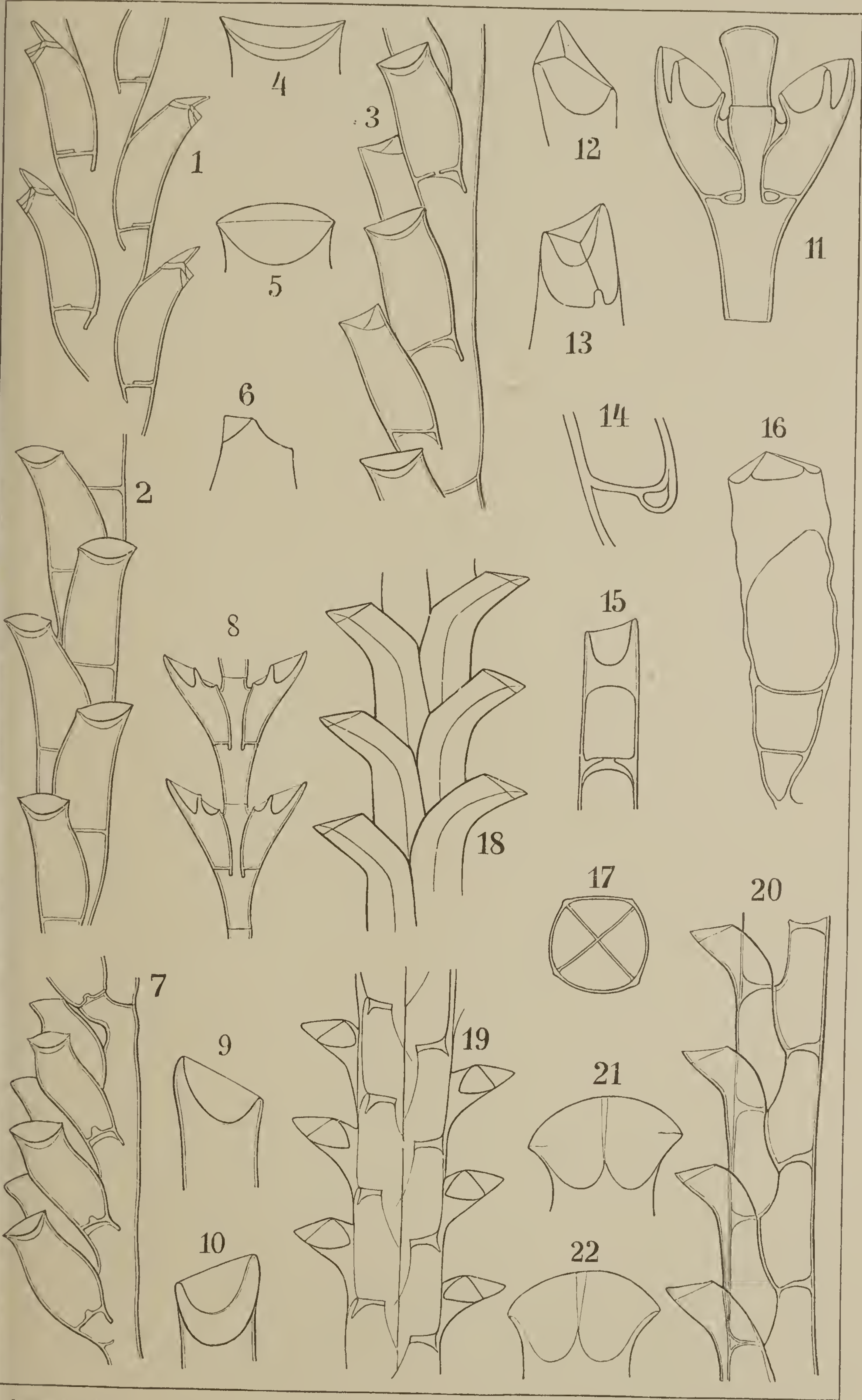
2. — Diagnoses of new genera and species of Hydroida. (Journal Linnean Society, Zoology, vol. XII, 1876, p. 251—284, pls. IX—XXIII).

3. — Report on the Hydroida collected during the exploration of the Gulf-stream by L. F. de Pourtales, (Memoirs of the Museum of Comparative Zoology at Harvard College, V, No. 2, Cambridge 1877, pag. 1—66, pls. I—XXXIV).



Levinsen del.

Typ. Bianco Luno



Levinsen del

Typ. Bianco Luno

4. Allman, G. J.: Description of Australian, Cape and other Hydroida, mostly new, from the collection of Miss Gatty. (Journal Linnean Society, Zoology, vol. XIX, 1886, p. 132—161, pls. VII—XXVI).

5. — Report on the Hydroida dredged by H. M. S. Challenger during the years 1873—76. Part. II. The Tubularinæ, Corymorphinæ, Campanularinæ, Sertularinæ, and Thalamophora. (The voyage of H. M. S. Challenger. Zoology. Vol. XXIII, 1888).

6. — Audouin, V. et Milne Edwards, H. Résumé des recherches sur les animaux sans vertèbres faites aux îles Chausey (Annales d. sciences naturelles, Zoologie, sér. I, T. 15, 1828, pag. 5—19).

6a. — Agassiz, Al. North American Acalephae (Memoirs Museum Compar. Zoology at Harvard college, vol. I, No. II, 1865).

7. Bale, V. M.: Catalogue of the Australian Hydroid Zoophytes, 1884, 198 pag., 19 plates.

8. — On some new and rare Hydroida in the Australian Museum collection (Proceedings of the Linnean society of New South Wales, 2 d ser. vol. 3, 1889, pag. 745—799, pls. XII—XXI).

9. Bilard, A. Hydroïdes de Madagascar et du Sud-Est de l'Afrique. (Archives de Zoologië expérimentale. 4ième Sér., T. VII, No. 8, 1907, p. 335—396, pl. XXV—XXVI.

10. — Sur les Haleciidæ, Campanularidæ et Sertulariidæ de la collection du Challenger (Comptes rendus d. séances de l'académie d. sciences, T. 147, 1908, pag. 1355—1358).

11. — Hydroides (Expéditions scientifiques du "Travailleur" et du "Talisman" pendant les annnés 1880, 1881, 1882, 1883, Paris 1906, pag. 153—241.

12. Bonnevie, K.: Hydroida. (Den Norske Nordhavs-Expedition 1876—1878 XXVI), Christiania 1899.

13. Broch H. Die Hydroiden d. arktischen Meere, Fauna arctica. Fünfter Band. Erste Lieferung. 1909.

14. — Hydroidenuntersuchungen III. Vergleichende Studien an Adriatischen Hydroiden (Det Kgl. Norske Videnskabers Selskabs Skrifter 1911, NR I, 65 pag.) Trondhjem, 1912.

14a. Campenhausen, B. v.: Hydroiden von Ternate. (Abhandl. herausg. v. d. Senckenbergischen naturf. Gesellschaft, B. XXIII, 1897, p. 297—317, Taf. XV).

15. Clark, S. F.: The Hydroids of the Pacific coast of the United States, south of Vancouver Island. With a report upon those in the Museum of Yale College (Transactions of the Connecticut academy, vol. III, 1876, VI, pag. 349—264, pls. XXXIII—XL).

15a. Clarke, S. F.: Report on the Hydroids collected during the exploration of the Gulf stream and Gulf of Mexico by Alexander Agassiz 1877—78. (Bulletin Museum Comp. Zoology of Harvard College, Vol. 5, 1878—79, No. 10, p. 240—252, pls. 1—4).

16. Clarke, S. F.: Reports on the scientific results of the expedition to the eastern tropical Pacific ..... by the U. S. fish commission steamer "Albatross", ... VIII. The Hydroids, 18 pag., pl. 1—15. (Memoirs of the Museum of Comparative Zoology at Harvard College vol. XXXV. No. 1). 1907.

17. Driesch, H.: Tektonische Studien an Hydroiden. (Jenaische Zeitschrift f. Naturwissenschaft). 24. Band. 1890.

18. Ellis, J.: Essay towards a natural history of the corallines, London 1755.

19. Hartlaub, Cl.: Revision der Sertularella-Arten. (Abhandlungen aus dem Gebiete der Naturwissenschaften herausgegeben vom naturwissenschaftlichen Verein in Hamburg. XVI Band, Hamburg 1900—1901).

20. — Résultats du voyage du S. Y. Belgica en 1897—1899. Zoologie. Hydroiden, 1904. (Expédition antarctique Belge), pag. 1—17, pl. I—IV.

21. — Die Hydroiden der magalhaensischen Region und chilenischen Küste. (Zoologische Jahrbücher: Abtheilung für Systematik, Geographie u. Biologie d. Thiere: Supplement VI: Dr. L. Plate, Fauna Chilensis. Dritter Band. Heft. 3. Jena 1905).

22. Hincks, T. H.: A History of the British Hydroid Zoophytes. London 1862. 2 vols.

23. — A History of the British Marine Polyzoa, 1880. 2 vols.

24. Jeffreys, J. G. and Norman, A. M.: Submarine-Cable Fauna. (Annals Natural Hist. [4 ser.] XV, 1875, pag. 169—176, pl. XII).

25. Jäderholm, E.: Ueber aussereuropäische Hydroiden des zoologischen Museums der Universität Upsala. (Bihang till K. Svenska Vet-Akad. Handlingar, Band 21. Afd. IV, No. 6, pag. 1—20, Taf. 1—2). Stockholm. 1896.

26. — Aussereuropäische Hydroiden im Schwedischen Reichsmuseum (Arkiv för Zoologi utgifvet af K. Svenska Vetenskapsakademien. Band 1, pag. 259—312, Taf. 12—15). Stockholm. 1903.

26 a. — Hydroiden aus den Küsten von Chile (Arkiv för Zoologi, Band 2, No. 3, 1904, p. 1—7, Taf. 1).

27. — Northern arctic invertebrates in the collection of the Swedish State museum. IV. Hydroiden, pag. 124, Taf. I—XII.[1]) (Kungl. Svenska Vetenskabsakademiens Handlingar, B. 45, No. 1, 1909).

27 a. — Hydroiden aus antarktischen und subantarktischen Meeren (Wissenschaftliche Ergebnisse d. Swedischen Südpolar-Expedition 1901—1903. B. V, Lief. 8, 1905).

28. Kirchenpauer, G. H.: Nordische Gattungen u. Arten von Sertulariden (Abhandlungen aus d. Gebiete d. Naturwissenschaften herausgegeben von Naturwissenschaftlichen Verein in Hamburg. VIII Pt. 3, 1884).

---

[1]) The plates contain excellent figures of most species. drawn by G. Liljevall.

29. Kirchpatrick, R.: Reports on the zoological collections made in Torres Straits by Professor A. C. Haddon 1888—1889. Hydroida and Polyzoa. (Scientific Proceedings of the Royal Dublin Society, N. S., vol. VI, part. X, 1890. Hydroida pag. 604—611, pls. XIV—XV).

30. Kramp, P.: Report on the Hydroids collected by the Danmark-Expedition. (Danmark-Ekspeditionen til Grønlands Nordøstkyst 1906—1908, Bind V, NR. 7, "Meddelelser om Grønland" XLV, pag. 341—396, pls. XX—XXV), København, 1911.

31. Lamarck, J. B. de: Histoire naturelle des animaux. sans vertèbres. Deuxième édition. T. 2. 1836.

32. Levinsen, G. M. R.: Meduser, Ctenophorer og Hydroider fra Grønlands Vestkyst tilligemed Bemærkninger om Hydroidernes Systematik. (Vidensk. Meddel. Naturh. Foren. Kjøbenhavn 1892, p. 1—70, Tab. V—VIII). Kjøbenhavn 1893.

32 a. — Om Fornyelsen af Ernæringsindividerne hos Hydroiderne. (Vidensk. Meddel. Naturh. Foren. Kjøbenhavn, 1892, p. 14—31, Tab. 1.), Kjøbenhavn 1893.

33. — Annulata, Hydroidæ, Anthozoa, Porifera. (Det videnskabelige Udbytte af Kanonbaaden "Hauch's" Togter i de danske Have indenfor Skagen i Aarene 1883—1886. Hydroidæ p. 363—399, Tab. 1, figs. 7—11.) Kjøbenhavn 1893.

34. — Om en ny *Thujaria*-Art fra Kara-Havet, *Thujaria carica* nov. sp. (Vidensk. Meddelelser fra d. naturh. Forening i Kjøbenhavn 1892, pag. 213—214, Tab. VII, figs. 26—29). Kjøbenhavn 1893.

35. — Morphological and systematic studies on the cheilostomatous Bryozoa, pag. I—VII, 1—431, 27 pls. Copenhagen 1909.

36. Marktanner-Turneretscher, G.: Die Hydroiden des k. k. naturhistorischen Hofmuseums. (Annalen d. k. k. naturhistorischen Hofmuseums, V Band, 1890, pag. 196—286, Tab. III —VII).

37. — — Hydroiden — Zoologische Ergebnisse der im Jahre 1889 .... ausgeführten Expedition nach Ost-Spitzbergen (Zoologische Jahrbücher, Abtf. f. Systematik. Bd. 8, 1895).

38. Mereschkowsky, C.: On a new genus of Hydroids from the White Sea with a short description of other new hydroids (Annals Nat. Hist. [4. ser.] vol. XX, 1877, pag. 220—229, pls. V—VI).

39. Mereschkowsky, C.: Studies on the Hydroida. (Annals Natural. Hist. [5. ser.] vol. 1, 1878, pag. 322—340.

40. — New Hydroidæ from Ochotsk, Kamtschatka and other parts of the North Pacific Ocean. (The Annals and Magazine of Natural History [5. ser.], vol. II, 1878, pag. 433—451, pls. XVI—XVII).

41. Milne-Edwards, H.: Recherches anatomiques physiologiques et zoologiques sur les Eschares (Annales d. Sciences naturelles, Zoologie [2], VI, 1836, pag. 5—53, pls. I—V).

42. Norman. A. M: Note on *Selaginopsis* (= *Polyserias*) *Hincksii* Mereschkowsky, and on the circumpolar distribution of certain Hydrozoa. (Annals Natural Hist. [5. ser.] vol. 1, 1878, pag. 189—192).

43. — A month on the Trondhjem fjord, Polyzoa. (Annals of Nat. Hist. [6 s.], vol. XIII, 1894, pag. 112—133, pls. V, VII).

44. Nutting, C. L.: American Hydroids. Part II. The Sertularidæ. Washington 1904.

45. — Hydroids of the Hawaiian Islands collected by the steamer Albatross in 1902 (Bulletin of the United States Fish-Commission. Vol. XXIII, for 1903 p. 933—959, pls I—XIII. Washington 1906).

45 a. — Hydroids from Alaska and Pout Sound (Proced. United States National Mus.: vol. XXI, p. 741—753, pl. 62—64)

46. Pictet, C.: Etude sur les Hydraires de la baie d'Amboine. (Revue Suisse de Zoologie et annales du musée d'histoire naturelle de Genève, T. 1, 1893, pag. 1—64, pls. I—III).

47. Pictet, C. et Bedot, M.: Hydraires provenant des campagnes de l'Hirondelle (1886—1888) (Résultats des campagnes scientifiques accomplies sur son yacht pa Albert 1'er . . . . . Fasc. XVIII 1900).

48. Quelch, J. J.: On some deep sea and shallow-water Hydrozoa. (Annals Nat. Hist. [5], vol. XVI pag. 1—20, pl. I—II, 1885).

49. Ritchie, J.: Note on the probable origin of the hydroid genus *Selaginopsis* (Proceedings R. Physical Society, vol. XVII No. 6, 1902, pag. 221—222).

50. — The Hydroids of the Scottish National Antarctic Expeditio (Transactions of the Royal Society of Edinburgh vol. XLV part II (No. 18). pag. 519—355, pl. I—III, Edinburgh 1907

51. — Supplementary report on the Hydroids of the Scottis National Antarctic Expedition (Transactions Royal Soc. of Edingburgh, vol. XLVII, part 1 (No. 4) pag. 65—101 Edinburgh 1909.

52. — Contribution to our knowledge of the hydroid fauna of the West of Scotland (Annals Scottish Natural Histor 1910, pag. 220—225).

53. Ritchie, J.: Contribution ..... (continued) (Annals Scottish Nat. Hist., 1911, pag. 30—34, pag. 158—164 and pag. 217—225.

54. Schneider, C.: Hydroidpolypen von Rovigno nebst Uebersicht über das System der Hydroidpolypen im Allgemeinen (Zoologische Jahrbücher, Abtheilung für Systematik, Geographie u. Biologie d. Thiere. Zehnter Band, 1897, pag. 472—555).

55. Schydlowsky, A.: Matériaux relatifs à la faune des Polypes hydraires des mers arctiques. I. Les Hydraires de la Mer blanche le long du littoral des îles Solowetzsky. Karkov 1901.

56. Sæmundsson, B.: Bidrag til Kundskaben om de islandske Hydroider. II. (Videnskabelige Meddelelser fra d. naturhistoriske Forening i København, 1911, Bind 63, pag. 67—107). København 1912.

57. Torrey, H. B.: The Hydroida of the Pacific coast of North America. (University of California Publications, vol. 1, 1902, pag. 1—82, pls 1—11).

58. — The Hydroids of the San Diego region. (University of California Publications. Zoology. Vol. II, No. 1, pag. 1—43). 1904.

59. Vanhöffen, E.: Die Hydroiden d. Deutschen Südpolar-Expedition. (Die Deutsche Südpolar-Expedition 1901—1903, Bd. XI. Zoologie III, pag. 271—340).

14.—2.—1913.

A new species of Hilara.

By

William Lundbeck.

Hilara anglodanica n. sp.

Male. Vertex and frons velvet black, above the antennæ a greyish or brownish grey triangle, reaching about to the ocellar tubercle. Epistoma brownish; palpi greyish, with long hairs, among which especially one long bristle. Occiput dark grey, with somewhat long, black hairs. Antennæ black, the style fully as long as the third joint. Thorax grey pruinose, only very slightly shining; it is lightest when seen from in front; between the acrostichal and dorsocentral bristles there is on each side a not very distinct, slightly brownish stripe, sometimes almost not perceptible. The dorsocentral and acrostichal bristles of some length, black, the former uniserial, longest behind and especially the last is long; the acrostichal bristles regularly quadriserial. Further a humeral bristle, a posthumeral (or præsutural), three notopleural, about four supraalar bristles, but only the hindmost long, the two anterior placed besides each other and small, finally a postalar bristle; anteriorly in the præsutural depression are some small hairs. Scutellum grey, with four long bristles, the median pair longest. Pleura grey or dark grey pruinose. Abdomen a little narrowed towards the end, black, very thinly greyish pruinose and somewhat shining; it is generally slightly translucently brownish at the base. It is clothed with short, black hairs, and has rather long, but fine hind-marginal bristles. Venter similarly coloured, but quite dull, and with quite short hairs. Exterior genitalia not large, distinctly grey

pruinose; the lamellæ black, shining, with rather dense, black hairs; they are cleft at the apex. Legs black, a little dark greyish pruinose, the coxæ most distinctly; the knees very narrowly reddish, most distinctly on the hind knees. Front femora with a little longish hairs on the posterior side; middle femora with a row of bristly hairs on the anterior side, longest at base and apex; hind femora with longish hairs above and below, longest below towards the apex and here almost bristly; front tibiæ with fine hairs above, being longest and bristly towards the base, and with rather dense hairs on the posterior side; middle tibiæ mainly short-haired, with a bristle at the base on the anterior side and one below about one third from the apex; hind tibiæ with a dorsal and anterior row of somewhat long bristles, and short-ciliated below. Front metatarsus cylindrical, a little spindle-shaped, somewhat thickened and somewhat thicker than the end of tibia; it is three fourth of the length of tibia and somewhat longer than the other four joints; it is densely short-haired below and a little longer haired above, and here generally with two longer hairs, one near the apex and another in or more or less above the middle; all tarsal joints are longer than broad, the fourth joint on the middle tarsi is the shortest. All hairs on the legs are black or blackish. Wings a little brownish tinged; veins black or brownish black; the upper branch of the cubital vein issuing almost rectangularly, after the curve it is nearly straight and a little diverging; anal vein fine and pale, disappearing somewhat before the margin. Stigma brown or blackish brown, long, its inner end nearly opposite to the medial cross-vein. Halteres black, the peduncle brown, especially towards the base.


Hilara anglodanica ♂, front leg. × 30.

Female. Similar to the male; the front metatarsus simple,

fully half as long as tibia, but not so long as the four following joints; the whole tarsus a little longer than the tibia; hind tibiæ quite simple.

Length. The species may vary somewhat in size, from 3,5 to nearly 5 mm., the female is smallest.

Not quite mature specimens may have the legs, especially the front legs, somewhat brownish, and the base of abdomen more translucently brown.

This species seems to be somewhat nearly related to *H. dimidiata* Strobl (according to the description), but it is distinguished by several characters, among others a different coloration of thorax and distinct marginal bristles on abdomen; also the front legs are differently constructed; the female is at once distinguished by the quite simple hind tibiæ. It may also remind one of *H. lurida* Fall., but the male has thicker front metatarsi and both sexes are distinguished by the quite regular quadriserial acrostichal bristles. — Among the Danish species it will be known without difficulty, and it will be easily placed in the table I have given in Dipt. Dan. III; it may here I think only be sought under division 8, and here are only two species, *H. nigrina*, which is very different by the dark wings and dull black abdomen, and *quadrifaria*, which has a blackish brown thorax; both species have in the female thickened hind tibiæ.

H. anglodanica was first found in 1911 when I took five specimens on Bornholm in the wood Almindingen; in 1912 it was not uncommon in Dyrehaven at Copenhagen, flying ower ditches; this is somewhat curious, for in the preceding years, when I eagerly collected species of *Hilara* on several localities, I did not at all observe the species. My dates of capture are $^{29}/_{6}$—$^{10}/_{8}$.

When I corresponded with Mr. Collin about the species, he kindly informed me, after having examined it, that it is not uncommon in England, its geographical distribution thus at present being Denmark and England.

15.—2.—13.

Corrections to the paper on the Malacostraca from the Tjalfe-Expedition.

By

K. Stephensen.

Acanthephyra (p. 64).

During a visit to Copenhagen last summer (1912) Cand. real. O. Sund, Assistant at the Fisheries-Investigation in Bergen, Norway, studied the material of the genera *Acanthephyra* and *Pasiphae* preserved in the Zoological Museum in Copenhagen. At the named time I was on a zoological research in Greenland; but Mr. O. Sund has left a note, wherein he writes that all the specimens of *A. purpurea* M. Edw. in our museum do not belong to this species, but to *A. multispina* Coutière, and after my return from Greenland I have convinced my-self that he is right. Accordingly all the Greenland specimens of the genus *Acanthephyra*, also those from the „Tjalfe"-Expedition, in reality belong to *A. multispina.*

A short report will be given in Conspectus Crustaceorum et Pycnogonidorum Groenlandiæ, Meddel. om Grønland vol. 22, 1913, p. 44—47; but later on I intend to give the results of a closer examination in: Crustacea, in Report on the Danish Oceanographical Expeditions 1908—1910 to the Mediterranean and adjacent seas, published at the cost of the Carlsberg Fund under superintendance of Johs. Schmidt, Ph. D.

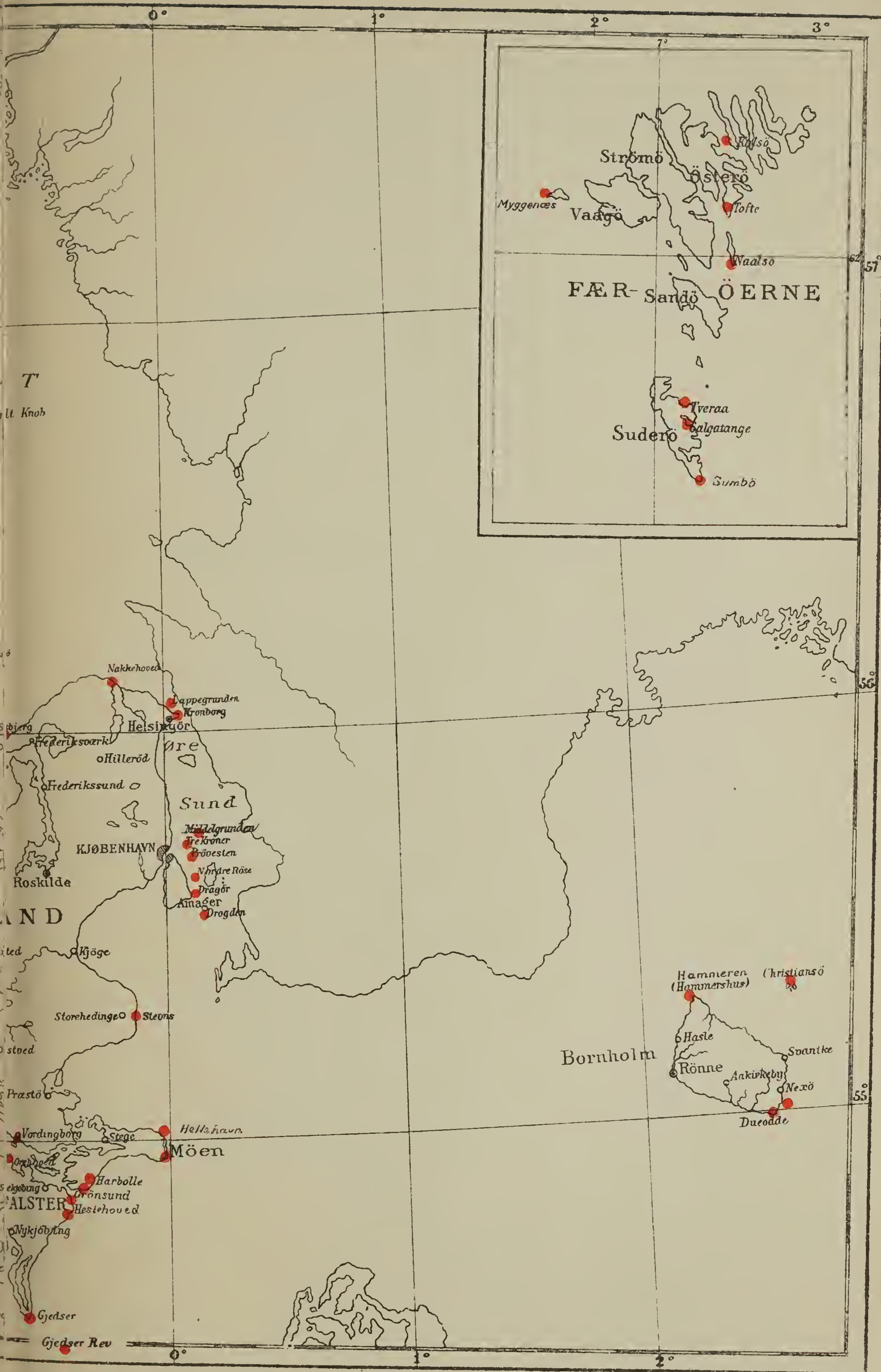
Boreomysis tridens and **B. nobilis** (p. 78).

On account of a very unfortunate mistake I have on 3 of the labels for *B. tridens* in stead of the right name written *B. nobilis.*

B. nobilis is a true arctic species, that has never been found South of the ridge in the Davis-Strait; my 3 first localities for *B. nobilis* (St. 431: 63° 24′ N, 53° 10′ W, 892 m., trawl. — St. 337: 64° 05′ N, 52° 20′ W, 1100 m., trawl. — St. 407—08: 64° 14′ N, 55° 55′ W, 839 m., clay, trawl) are thus to be referred to *B. tridens*.

20.—2.—1913.


DANMARK
Fyr, Fyrskib.
Skagens Rev
Skagen
Hirtshals
Rubjerg Knude
Hjörring
Hirtsholm
Frederikshavn
Læsö Trindel
Nordre Rön
Vendsyssel
Sæby
Læsö
Læsö Rende
Kobbergrund
Hanstholm
Östre Flak
Aalborg
Egense
Thisted
Lögstör
Nibe
Thy
K A T T E
Lodbjerg
Nykjöbing
Mors
Thyborön Kanal
Salling
Hobro
Mariager
Udbyhöj
Skive
Bovbjerg
Lemvig
Struer
Viborg
Randers
Fornæs
Grenaa
Holstebro
J Y L L A N D
Æbeltoft Vig
Schultz's Grund
Silkeborg
Aarhus
Æbeltoft
Hjelm
Herning
Ringkjöbing
Lyngvig
Sletterhage
Skanderborg
Thunö
Sejrö
Horsens
Samsö
Vestborg
Refsnæs
Vejle
Kallundborg
Æbelö
Varde
Horns Rev
Store
Blaavandshuk
Fredericia
Strib
Bogense
Romsö
Kolding
Middelfart
Vyl
Sædenstrand
Esbjerg
Skallingen
Kjerteminde
Belt
Odense
Graadyb
Ribe
Lille
Bhagö
Assens
F Y E N
Nyborg
Sprogö
Korsör
Knudshoved
Slipshavn
Belt
Helnæs
Hov
Faaborg
Svendborg
Skjoldnæs
Tranekjær
Rudkjöbing
LANGE
LAND
Ærösköbing
Marstal
Taars
Nakskov
Albuen
Kjels Nor
(Fakkebjerg)
57°
56°
55°
4°
3°
2°



Strömö
Österö
Myggenæs
Vaagö
Tofte
Naalsö
FÆR- Sandö ÖERNE
Tveraa
Suderö
Sumbö
Nakkehoved
Lappegrunden
Kronborg
Helsingör
Frederiksværk
Hilleröd
Öre
Frederikssund
Sund
Middelgrunden
Trekroner
Pröövesten
KJØBENHAVN
Roskilde
Dragör
Amager
Drogden
Kjöge
Storehedinge
Stevns
Hammeren
(Hammershus)
Christiansö
Hasle
Bornholm
Rönne
Svanike
Aakirkeby
Nexö
Dueodde
Præstö
Vordingborg
Stege
Möen
Harbolle
Grönsund
FALSTER
Hestehoved
Nykjöbing
Gjedser
Gjedser Rev
0°
1°
2°
3°
55°
56°
57°

Videnskabelige Meddelelser

fra

Dansk naturhistorisk Forening i Kjøbenhavn

Bind 65.

Udgivne af Selskabets Bestyrelse.

Med 6 Tavler og Figurer i Texten.

Syvende Aartis femte Aargang.

Kjøbenhavn.
Bianco Lunos Bogtrykkeri.
1913.

Redaktionen af dette Bind er besørget af Dr. *Th. Mortensen.*

Indhold.

Forklaring af Tavlerne.

Tavle I. *Centrolophus britannicus* Gthr. ♂

Tavle II. *Phycis borealis* n. sp. ♀

Tavle III. Type-Exemplarer af Spengler'ske Unionider. (Jfr. Side 66).

Tavle IV. Abnorme Asterider og Ophiurer. (Jfr. Side 249).

Tavle V—VI. Forskellige *Tapes*-Former. (Jfr. Side 300).

Oversigt

over

de videnskabelige Møder

i

Dansk naturhistorisk Forening

i Vinterhalvaaret 1912—13.

Den 25. Oktober 1912. Dr. *C. Wesenberg-Lund* gav Meddelelse om gravende Dytisc-Larver (*Noterus*) og om Kokondannelsen hos Hydrophilerne. (Jfr. for *Noterus* Afhandlingen: »Biologische Studien über Dytisciden.« Internat. Rev. d. ges. Hydrobiol. u. Hydrographie. 1912. Iagttagelserne over Hydrophilerne vil senere fremkomme i samme Tidsskrift). Cand mag. *Ad. S. Jensen* forelagde Pars I af Lamellibranchiaterne fra »Ingolf«-Expeditionen.

Den 8. November. Dr. *V. Nordmann* gav Meddelelse om *Anomia squamula*, fossil fra Spitsbergen. (Jfr. Medd. Dansk Geol. Foren. Bd. 4. S. 75). I Anledning heraf bemærkede Cand mag. *Ad. S. Jensen,* at den af Gunnar Andersson anførte Paastand, at modne *Empetrum nigrum*-Frugter var fundne fossile paa Spitsbergen i postglaciale Dannelser, medens *Empetrum* nu ikke faar modne Frugter der, ikke længere kan bruges som Bevis for en varmere Periode i postglacial Tid. En norsk Fangstmand har nemlig for nylig hjembragt *Empetrum* med modne Frugter fra Spitsbergen (meddelt i »Naturen« December 1910). Men dette influerer ikke paa de af Mollusklevningerne dragne Slutninger.

Derefter gav Cand mag. *Ad. S. Jensen* Meddelelse om Grønlands Selachier.

Den 22. November. Referatmøde. Mag. sc. *K. S. Bardenfleth* gav Referat af *Leduc*'s Forsøg paa en mekanisk Forklaring af vitale Cellebevægelser (Steph. Leduc. La biologie synthétique. 1912). Foredragsholderen mente, at Leduc's Opfattelse af Ligheden mellem vitale og rent fysiske Forhold var en Misforstaaelse, og hertil sluttede sig meget bestemt Prof. *V. A. Poulsen*, Prof. *Jungersen* og Pastor *Breitung*.

Mag. sc. *P. Kramp* foreviste nogle Dybhavs-Meduser fra

„Tjalfe"-Expeditionen (jfr. Afhandlingen: „Medusæ collected by the „Tjalfe" Fxpedition; dette Bind, S. 257). I Tilslutning hertil meddelte Prof. *Jungersen* nogle Bemærkninger om de paa „Ingolf"-Expeditionen iagttagne Dybhavs-Meduser. Lærer *J. P. Kryger* foreviste nogle Insekter med Oliebillelarver samt Larver af Spanskfluebillen.

Den 6. December. Professor *Jungersen* holdt Foredrag om en ny parasitisk Copepod, *Chordeuma obesum*, snyltende i det Indre af Slangestjernen *Asteronyx Loveni*. (Med Lysbilleder). (Afhandlingen publiceres i „Mindeskrift for Japetus Steenstrup"). Inspektor *G. M. R. Levinsen* gav Meddelelse om sine Undersøgelser over Sertulariernes Slægtskabsforhold. (Se Afhandlingen „Systematic Studies on the Sertulariidae" i Bind 64, dette Tidsskrift).

Den 20. December. Inspektor *W. Lundbeck* forelagde Pars IV af „Diptera Danica"; Dolichopodidae. Dr. *Mortensen* bemærkede, at naar det om visse Arter af disse — saavel som andre Dyr — sagdes, at de intetsteds var almindelige, saa maatte det vistnok bero paa, at man ikke havde fundet disse Dyrs egentlige Opholdssted eller ikke truffet at komme i den Tid, Dyrene er rigig fremme.

Den 17. Januar 1913. Referatmøde. Dr. *Th. Mortensen* 1) foreviste nogle Præparater af Protozoer: store Kolonier af Vorticeller fra Holte og *Ophrydium versatile* fra Gentofte Sø; 2) meddelte i Anledning af den i »Vid. Medd." 1908 beskrevne Kæmpekoloni af Bakterier fra Vestindien, at den har vist sig at være identisk med en af *A. Dendy* under Navnet *Pontobolbos manaarensis* beskreven Organisme fra Ostindien (Journ. Linn. Soc. London. Zoology XXVI. 1897). Det vil da formentlig vise sig, at denne ejendommelige Traadbakterie er kosmopolitisk i den varme Zone; 3) gav Referat af nyere Studier over Echinidernes fylogenetiske Udvikling (*Tornquist:* „Die biologische Deutung der Umgestaltung der Echiniden im Palæozoikum und Mesozoikum": Zeitschr. f. induktive Abstammungs- u. Vererbungslehre. VI. 1911 og *R. T. Jackson* „Phylogeny of the Echini". Jfr. Afhandlingen "Echinological Notes" V, dette Bind, S. 211).

Frøken *Ellen Hansen* gav en kort Meddelelse om en Musvit, der gentagne Gange var fløjet ind gennem Vinduet og havde hakket af et Stearinlys, der stod inde i Værelset paa Toiletbordet. — Mag. sc. *K. Henriksen* gav Referat af nogle Undersøgelser over *Perilampus*-Larvens Udvikling (Harry S. Smith: The chalcidoid genus Perilampus and its relations to the Problem of Parasite Introduction. U. S. Dep. Agric. Bureau of Entomol. Tech. Ser. No. 19. IV. Washington. 1912).

Den 31. Januar. Dr. *C. G. Joh. Petersen* holdt Foredrag om Havbundens Dyresamfund og deres Betydning for den marine Zoogeografi (med Lysbilleder). (Se Beretning XXI. 1913, fra den danske biologiske Station). I den dertil knyttede Diskussion deltog Prof. *Raunkjær*, Cand. mag. *Ad. Jensen* og Dr. *Th. Mortensen*.

Den 14. Februar. Mag. sc. *K. S. Bardenfleth* holdt Foredrag om Tandformernes Udvikling hos Pattedyr, særlig Rovdyr. (Jfr. Afhandlingen i dette Bind, S. 67). Derefter gav Stud. vet. *H. O. Schmit-Jensen* Meddelelse om experimentelt fremkaldt Tibia- og Tarsusdannelse hos en Phasmide. (Jfr. Afhandlingen i dette Bind. S. 113). Endelig gav Dr. *Th. Mortensen* Meddelelse om nogle antarktiske Echinodermlarver og deres zoogeografiske Betydning. (Jfr. Afhandlingen „Die Echinodermenlarven d. deutschen Südpolar-Expedition". 1913).

Den 28. Februar. Referatmøde. Docent *R. H. Stamm* holdt Foredrag om de kønsbestemmende Elementer i Cellekernen (Heterochromosomerne) (med Lysbilleder).

Ved den sædvanlige „indirekte" Celledeling sondres ved Delingens Begyndelse Kernens ejendommeligste Bestanddel, Chromatinet, et Antal indbyrdes frie Chromosomer, hvis Antal saavel som Form kan være højst varierende, men som altid hos samme Dyreart er tilstede i samme Antal. Idet Delingen skrider frem, spaltes hvert Chr. paa langs, og Delingsstykkerne føres bort fra hinanden hen imod Cellens to „Poler"; her forenes disse halverede Chr. atter til en ny Kerne, som saaledes opbygges af det samme Antal Chr. som Modercellen. Dette gentages ved alle Celledelinger hele Livet igennem.

Alene Kønscellerne danner en Undtagelse herfra; her indtræder, for de hanlige Cellers Vedkommende ved den ene af de to Delinger, som ligger umiddelbart før Spermatozoets Dannelse, og for de hunlige Cellers Vedkommende under Dannelsen af Polcellerne („Retningslegemerne"), en saakaldet „Reduktionsdeling", under hvilken det normale Antal Chr. ikke spaltes som sædvanligt, men i to Grupper, hvert med det halve Antal, fordeles til de to Poler, hvor de danner de nye Kerner. Spermatozoets og Æggets Kerne er saaledes „reduceret"; Betydningen heraf forstaaes let, naar det erindres, at Befrugtningen netop bestaar i en Forening af to Cellekerner; idet hver af disse kun medbringer det halve Antal Chr., dannes altsaa i det befrugtede Æg en Kerne med Artens typiske Chromosomebestand, der saaledes overleveres uforandret fra Generation til Generation.

Dette vort Kendskab til Befrugtningens morfologiske Side har i Løbet af det sidste Tiaar modtaget en interessant Berigelse ved Opdagelsen af de saakaldte „Heterochromosomer", som paa

ganske bestemt Maade staar i Forhold til det nye Individs Køn. Hchr. viser sig tydeligst under de Delinger, hvorved Sædcellerne reduceres; saaledes havde *Henking* allerede 1891 fundet, at af fire Celler, dannede af en Modercelle, var der to, hvis Kerner indeholdt 11 Chr., medens de to andre desuden indeholdt et „overtalligt" Chr.; dette var dannet, idet et Chr. uden at spaltes var gaaet hen til den ene Pol. Rigtigheden af denne Iagttagelse bekræftedes godt en halv Snes Aar senere af en Række amerikanske Forskere, nemlig *Mc. Clung*, *E. B. Wilson* og *Stevens*, som hos en Række forskellige Leddyr, ja endog hos enkelte Hvirveldyr, paaviste tilsvarende Forhold og desuden oplyste om den betydelige Variation i Størrelse og Antal, som disse Hchr. kan være underkastede. Samtidig fremsatte *Mc. Clung* den Tanke, om de ikke, da de var til Stede i Halvdelen af Spermatozoerne, kunde have nogen Betydning for Kønsbestemmelsen. Først da Undersøgelsen udstraktes til Ægcellen og de almindelige Vævsceller, lykkedes det dog at skabe et fastere Grundlag for en saadan Antagelse. Det viste sig nemlig ikke blot, at Ægcellens Kerne altid svarer til den Spermatozokerne, som indeholder Hchr., men desuden lykkedes det hos de hanlige og hunlige Dyr i Kernens Chromosomebestand at paavise en Forskel, som forklares godt ved den Antagelse, at Hannen er opstaaet af et Æg, befrugtet med et Spermatozo uden Hchr., Hunnen derimod af et Æg i Forbindelse med et Spermatozo med Hchr. Undersøgelser over forskellige Bladlus, hvor kønnede og parthenogenetiske Generationer vexler med hinanden, har yderligere bekræftet denne Paastand.

Smukkest og mest overbevisende træder dog disse Forhold, som vist af *Boveri* og hans Elever, frem hos forskellige Rundorme, hvor dels Chromosometallet er ringe, og hvor det desuden er muligt, paa Grund af Kønsorganernes simple Bygning, at udføre Undersøgelsen uden at benytte Snit. Tillige er det her, ved Iagttagelse af tidlige Embryonalstadier, lykkedes at paavise netop de Forskelligheder, som en Befrugtning med to Arter Spermatozoer maa medføre.

I de hidtil nævnte Tilfælde har det stedse været Spermatozoerne, som i Henseende til Kernen viste en Dimorfi; den Mulighed, at noget lignende ogsaa kunde findes hos Æggene, lader sig dog saa meget mindre afvise, som visse Resultater af Arvelighedsforskningen synes at pege i den Retning. Hidtil var det dog kun lykkedes, ret tvivlsomt endda, at finde Antydninger af noget saadant hos visse Søpindsvin; først for ganske nylig er en Dimorfi af Ægkernen med Sikkerhed bleven paavist hos en Natsommerfugl.

Om den virkelige Betydning af disse Hchr. eller „Kønschromosomer" er det i Øjeblikket ikke muligt at udtale sig med Bestemthed; det staar i Virkeligheden for os som noget ganske

gaadefuldt, hvorledes lidt mere eller mindre Chromatin kan betinge, om Udviklingen skal gaa i hunlig eller hanlig Retning. Som det morfologiske Udtryk for en Kønsdifferentiering, der saaledes hos adskillige Dyreformer med Sikkerhed lader sig spore tilbage til Individets første Opstaaen, har disse Dannelser imidlertid Krav paa den største Interesse. (Se iøvrigt: *Correns-Goldschmidt:* Die Vererbung und Bestimmung des Geschlechtes. Berlin, 1913).

R. H. S.

Dr. *C. G. Joh. Petersen* afsluttede sit Foredrag fra d. 31. Jan.

Den 11. April. Referatmøde. Cand. mag. *Sofie Petersen* holdt Foredrag om en nyopdaget Reliktfauna paa de svenske Østersø-Øer (med Lysbilleder). (Referat af *Eric Mjöberg.* Om en syd- og mellaneuropäisk relikt insektfauna på Gotland och Öland, jämte en del allmännare insektgeografiska spörsmål. Sv. Entom. Tidsskr. 1912. S. 177).

I Tilslutning dertil foreviste Docent *Stamm* en Sammenstilling af den ejendommelige blandede Ferskvands- og Brakvandsfauna, som lever i den finske Skærgaard.

Cand. mag. *Ad. S. Jensen* foreviste 2 ny *danske* Exemplarer af *Coronella austriaca* Laur., indkomne til Zoologisk Museums 1ste Afdeling. Det ene var indsendt af Hr. *Kristian Jørgensen*, Lærer ved Krabbesholm Højskole ved Skive. Det fangedes d. 8. Juni 1912 Kl. 4^{15} Em. ved Flyndersø, Rønbjerg St., ca. $1^1/_2$ Mil fra Skive „midt paa en temmelig tør Engstrækning, ca. 40 Meter bred, med Søen paa den ene og med høje, sandede, græs- og lyngbevoksede Skrænter paa den anden Side; faa Meter derfra fandtes to Firben og en Hugorm; det var en temmelig varm Dag, men ikke Solskin“. Exemplaret er meget smukt og godt konserveret; dets Totallængde udgør 450 Mm. Det andet Exemplar var skænket af Hr. Cand. mag. *P. B. Krarup.* Det var fundet allerede i 70'erne i forrige Aarhundrede ved Søndersø i Nordsjælland af en Arbejder, beskæftiget ved Anlægget af Vandværket; han bragte det til Lederen af Arbejdet, Hr. Lehmann, hvis Søn, senere Kursusbestyrer, nu Gymnasielærer Louis Lehmann, har foræret det til Poul Levison, der atter som Elev paa Hr. Lehmanns Kursus i Aaret 1903 skænkede det til Naturhistorielæreren, ovennævnte Cand. mag. Krarup. Dette Exemplar er 510 Mm. langt.

De to tidligere her fra Landet kendte Exemplarer af Glatsnogen var som bekendt tagne ved Hirtshals og ved Rørvig.

Docent *R. H. Stamm* foreviste en levende Løgfrø (*Pelobates fuscus*) fra Københavns Omegn.

Dr. *Th. Mortensen* gav Meddelelse om Resultatet af Forhandlingerne om Nomenclatur-Spørgsmaal (Suspension af den absolute Prioritet i Tilfælde, hvor denne vil have alt for menings-

løse Consequenser) paa den internationale Zoolog-Congres i Monaco i Marts 1913, hvor han havde repræsenteret Foreningen.

Derefter gav Dr. *Mortensen* et Referat af Kirkpatrick's Undersøgelser over *Eozoon*. (Jfr. R. Kirkpatrick. The Nummulosphere. 1913). Docent *J. P. Ravn* mente i Tilslutning til Ref., at de „Nummuliter", som Kirkpatrick mener at se allevegne, selv i eruptive Bjærgarter, kun er krystallinske Strukturer, der intet har med Organismer at gøre.

Den 25. April. Dr. *V. Nordmann* holdt Foredrag om sine Undersøgelser i Nordre Strømfjord og Giesecke Sø (Grønland); (med Lysbilleder). Cand. mag. *K. Stephensen* meddelte derefter nogle Bemærkninger om Grønlands Krebsdyr-Faunas zoogeographiske Forhold (se Afhandlingen om Danmark-Expeditionens Crustaceer i Medd. om Grønland, Bd. 45) og Dr. *Th. Mortensen* nogle Bemærkninger om Grønlands Echinoderm-Fauna. (Jfr. Conspectus Faunæ groenlandicæ. Grønlands Echinodermer. Medd. om Grønland. XXIII. 1913).

Den 8. Marts afholdtes en festlig Sammenkomst i Anledning af Hundredaarsdagen for *Japetus Steenstrups* Fødsel, hvor Foredrag holdtes af Professor *Jungersen*, Dr. *C. G. Joh. Petersen*, Professor *Eug. Warming* og Professor *Thoroddsen*.

Beretning om de i Sommeren 1913 af Dansk naturhistorisk Forening foretagne Excursioner.

Den 25. Maj. Excursion til Saltholm. Deltagernes Antal 21. Ledere Hr. *E. Lehn-Schiøler* og Docent *J. P. J. Ravn*.

Man sejlede fra Kastrup Kl. 9 og ankom efter ca. en Times Sejlads til Saltholm, hvor man strax spiste Frokost for at have hele Dagen ubeskaaren til Excursionen. — For at faa saa meget som muligt af Fuglelivet at se tog man Vogne; Fuglene, baade de voxne og Ungerne, er nemlig fortrolige med Vognene, medens de flygter og skjuler sig for et saadant større Selskab af spadserende Personer.

Henover de vide, flade Engstrækninger, hvor *Armeria* stod i fuldt Flor og gav et smukt blegrødt Skær, gik det nu i det friske, herlige Sommervejr. Hele Tiden var man ledsaget af Viber og Rødben, der skrigende og klagende kredsede om Selskabet, Allevegne var der Ryler (*Tringa alpina*), mest parvis. De syntes ganske ubekymrede og viste stadig deres Parringsflugt. — Snart fik man fat i de ny-udklækkede Unger, som man fra Vognene let kunde se løbe hen over Engen eller vadende langs Bredden af de talrige smaa Vandhuller, hvor Vandranunklen allevegne stod i Blomst. Man fik fat i Vibeunger, saa let kendelige paa deres

hvide Nakke og Duntop, de langbenede Rødbenunger og de nydeligste af alle: de smaa, graa Unger af hvidbrystet Præstekrave (*Ægialitis cantiana*). I et lille Vandhul laa en Spidsand (*Anas acuta*) med nogle Ællinger. Det lykkedes at faa fat i en af Ællingerne, og da den blev sluppen løs, saa man den svømme et langt Stykke under Vandet, idet man i det lave klare Vand hele Tiden kunde følge alle dens Bevægelser. Inde paa Engen fandtes senere en anden Spidsand med større Ællinger, som allerede var ifærd med at skifte Dundragten. Overordentlig interessant var det at se Moderen flagre omkring som anskudt for at aflede Opmærksomheden fra Ungerne. — Gravænder saas gentagne Gange. En Edderfugl saas paa Rede, og det var først, da man var ganske nær, at den lettede fra Reden, som indeholdt 4 Æg. — Foruden de nævnte Fugle var der talrige Lærker; en Rede med Æg fandtes og en næsten flyvefærdig Unge. Et Par Agerhøns saas ogsaa; men de hører ikke oprindelig hjemme der; de er indførte (fra Bøhmen) af Selskabet, der har Jagten paa Øen. — Endvidere fandtes et Par smaa Hareunger, som, da de ikke kunde undløbe, søgte at dække sig i Græsset.

Et Par Expl. af *Lacerta vivipara*, nogle Strandtudser og grønbrogede Tudser fandtes. Af Insekter var det mest iøjnefaldende *Carabus clathratus*, som var ret almindelig; den er iøvrigt sjælden paa Øerne.

Fra Engene kørte man nu ud til Stranden og gik saa et længere Stykke for at se paa Fuglelivet der. Man iagttog *Larus canus* (— flere Reder —), *L. argentatus* og *ridibundus*; *Sterna macrura* (? *hirundo*), *Sterna minuta* og *cantiaca* (to Expl., dog ikke paa nært Hold); talrige Strandskader, et Par *Strepsilas interpres* (dog ikke paa nært Hold) og et Par Strandbrokfugle (*Squatarola helvetica*). 4 Graa-Andrikker svømmede lidt ude fra Kysten.

Fra Stranden kørte man igen ind paa Engen, hvor man saa en Del Brushaner paa Kampplads og nogle Gravænder og Brunnakker (Pibeænder, *Anas penelops*). Ialt iagttoges 4 ♂ og 2 ♀ af *Anas penelops*; efter Hr. *Lehn-Schiøler's* Udsagn var det laarige Fugle, som aabenbart ikke ynglede. En død Sædgaas (*Anser segetum*) fandtes paa Engen. — I de lave Grønsværskanter i smaa Kalkgrave byggede talrige Digesvaler.

Ved et gammelt Kalkbrud gav Docent *Ravn* en kort Redegørelse for Saltholms Geologi. En Del smukke Forsteninger fandtes her i de gamle forvitrede Kalkbunker: *Terebratula lens*, Ananchyter, Bryozoer, *Gryphæa*, en smuk Hajtand o. s. v.

Kl. 4 var den overordentlig vellykkede Tur endt. Kl. 5 afsejledes til Kastrup.

Th. M.

Liste over Fuglearter iagttagne paa Saltholm d. 25 Maj 1913, meddelt af *E. Lehn-Schiøler.*

Anas boscas, *Anas acuta*, *Anas penelops*, *Tadorna vulpanser*, *Somateria mollissima*, *Larus agentatus*, *Larus canus*, *Larus ridibundus*, *Sterna cantiaca*, *Sterna hirundo* (?) maaske *macrura*, *Sterna minuta*, *Ægialitis cantiana*, *Ægialitis hiaticula*, *Squatarola helvetica*, *Vanellus cristatus*, *Hæmatopus ostreologus*, *Strepsilas interpres*, *Totanus calidris*

Machetes pugnax, Tringa alpina, Motacilla alba, Motacilla flava, Anthus pratensis, Saxicola oenanthe, Alauda arvensis, Phyllopseustes trochilus, Hirundo rustica, Hirundo riparia, Sturnus vulgaris.

Den 15. Juni Excursion til Bognæs Skov.

Fra Roskilde, hvor Deltagerne (14) samledes, med Motorbaad til Bognæs. Først bankedes paa Egene, men uden stort Udbytte; de uhyre Masser af Frostmaalerlarver, der 14 Dage i Forvejen fandtes paa Egene, var fuldstændig forsvundne; de var færdige med deres Udvikling. I et af de gamle rødmuldede Egetræer, hvor tidligere flere entomologiske Sjældenheder er taget, og som nu undersøgtes, fandtes ogsaa kun faa og almindelige Ting. Paa Skovbunden var Glechoma fuldt besat af de smukke *Aulax glechomæ*-Galler. Paa Eg saas smukke Gnav af Barkbillen *Scolytus intricatus*, ligesaa paa Ask af *Hylesinus fraxini*. I Stubbe fandtes adskillige *Cetonia*- og *Pyrochroa*-Larver, og paa Egegrene fandtes smukke, store *Coccus*, medens flere *Clytus*-Arter fløj paa Brændestablerne. Paa Urtica fandtes flere Kolonier af nyklækkede *Vanessa*-Larver.

Fra Bognæs førte Motorbaaden Deltagerne over til Boserup Skov, i hvis Pavillon Kaffen indtoges. Med Vogne tilbage til Roskilde.

K. H.

Den 12. Oktober. Excursion til Rude Hegn.

11 Deltagere. Først forevistes *Saperda populnea*-Galler paa Bævreasp, og paa Egene fandtes de alm. Cynipide-Galler af: *Dryophanta folii, longiventris, divisa, Neuroterus lenticularis, fumipennis, numismalis, Andricus ostreus, inflator, fecundatrix.* Paa Vejen saas adskillige *Telephorus*-Larver krybe. I Femsølyng Mose forevistes dernæst Insektlevningerne i Tørven, især af Vandkalve og Donacier, og adskillige bævergnavede Pinde fandtes. Tilbage til Holte over Sækkedamsmosen, hvor der sigtedes Skovbundsinsekter.

K. H.

Den Schibbyeske Præmie.

Præmien for Aaret 1913 tildeltes Mag. sc. *Hj. Ditlevsen* for hans Arbejde: Danish Freeliving Nematods. (Vid. Medd. Bd. 63).

Zoologiske Meddelelser fra Island.

Af

B. *Sæmundsson.*

XII.

7 Fiske, ny for Island, og Oplysninger om andre, tidligere kendte.

(Hertil Tavle I. og II.)

Siden Fremkomsten af mit Arbejde: Oversigt over Islands Fiske[1]), er den islandske Fiskefauna blevet beriget med ikke mindre end 7 Arter, om hvis Forekomst ved Island man den Gang var uvidende. Jeg ytrede ogsaa den Formodning i mine Meddelelser X., i nærværende Tidsskrift for 1907, at der var god Grund til at vente, at der efterhaanden vilde komme flere Fiske, ny for Islands Fauna. Denne Formodning har vist sig at have været ganske rigtig, thi jeg er nu i Stand til at føje syv ny Arter til de tidligere kendte[2]). Repræsentanterne for to af disse Arter har jeg dog ikke set selv, hvorom nærmere nedenfor, under paagældende Fiske.

De syv Fiske skal nu omtales i kronologisk Rækkefølge.

a. *Conger vulgaris* Cuv. Havaalen.

Af denne Fisk blev der fanget to Eksemplarer paa Line ved Vestmannøerne, den 1. August 1909, det ene paa 25, det andet paa 35 Fv.s Dybde. Disse to Eksemplarer er ikke helt udvoksne,

---

[1]) Skrifter udgivne af Komm. for Havundersøgelser. Nr. 5. København 1909.

[2]) De fire førstnævnte af dem har jeg kortelig omtalt i Skýrsla hins islenska náttúrufræðisfélags, 1909—1910.

da de henholdsvis kun er 90 og 99 cm. lange. Det mindste var overalt af mørkebrun Farve, undtagen paa Hovedets Underside, som var lysebrun; det største var lysebrunt paa hele Oversiden, ellers meget lystfarvet eller helt hvidt.

I mit ovenfor citerede Skrift gjorde jeg den Bemærkning, S. 107, at den af E. Olafsen og andre ældre Forfattere omtalte „Havaal“ ikke burde optages blandt islandske Fiske, som en veritabel Havaal, da jeg antog, at den paagældende Fisk snarest maatte være den almindelige Aal (*Anguilla vulgaris*), da Havaalens Forekomst ved Island ikke var blevet konstateret senere. Da nu dette er sket, saa kunde der være Grund til at antage, at den af de gamle Forfattere, særlig af E. Olafsen omtalte Aal virkelig havde været Havaalen. Men jeg tror alligevel, at det kun drejer sig om den almindelige Aal. E. Olafsen siger nemlig i sit Rejseværk[1]), S. 595, hvor han omtaler den almindelige Aal: „Man har ogsaa truffet store Aal i Stranden hvor fersk Vand rinder ned, om det er *Murœna (Conger)* eller Hav-Aal, skal jeg ikke sige.“ E. Olafsen har altsaa ikke selv set den, men mener blot, at store Aal, Folk har fortalt ham, at de har set i Stranden, hvor der var Kilder med Ferskvand (som det er Tilfældet flere Steder paa Reykjanes-Halvøen, hvor Lavamarkerne naar helt ud i Søen), muligvis skulde være Havaal. Selv har jeg hyppig set Aal paa saadanne Steder i Grindavik (Sydkysten af nævnte Halvø), og der er aldrig faldet mig ind andet, end at det var den almindelige Aal, som der er mange af i Brakvandsdamme og vandfyldte Lavakløfter i Kystens umiddelbare Nærhed, og hvorfra de har fri Passage til Strandens Pytter, gennem underjordiske Lavaprækker eller Huler. Andre Forfattere, som Olavius og Mohr, har saa senere optaget Havaalen, efter Olafsen, som muligvis forekommende ved Island.

Af det ovenfor anførte vil det være indlysende, at det føromtalte Fund af Havaalen i islandske Farvande ingen Grund giver mig til at antage den for tidligere kendt ved Island.

---

[1]) Reise igiennem Island, Sorøe, 1772.

b. *Lycodes Esmarki* Coll.

Af denne Fisk er der i de sidste tre Aar efterhaanden indkommet fire Eksemplarer til vor naturhistoriske Samling. Det første af dem blev fanget paa Line, af islandske Fiskere, ud for Siglufjord paa Nordkysten i August 1909, uden nærmere Angivelse af Lokaliteten (antagelig paa 80—100 Fv.). Den blev foræret til Samlingen af Hr. Skolebestyrer St. Stefánsson i Akureyri. Eksemplaret var 51 cm. langt, men desværre uden Indvolde.

Den 3. Oktober 1910 blev det næste Eksemplar fanget, ligeledes paa Line, men i Mundingen af Eyjafjord, og den 17. Juni 1911 blev igen en Fisk af denne Art fanget paa Line udfor Siglufjord, denne Gang paa 160—180 Fv. Ogsaa disse to Fiske blev indsendt til Samlingen af Hr. Stefánsson, men ved et Uheld blev de halvt ødelagt undervejs, dog kunde jeg konstatere Rester af Ophiurider i deres Mave. Deres Længde var henholdsvis 54 og 56 cm.

Endelig blev det fjerde Eksemplar taget den 4. Juni 1911 af en islandsk Trawler paa c. 100 Fv., 18—20 Kvml. SSO. af Skæret Hvalsbæk ud for Østkysten (Berufjord). Fisken var levende, da den kom op, og blev holdt saaledes nogle Dage. Den var nylig død, da den ankom til Reykjavik, og blev foræret til Samlingen. Eksemplaret, som er en Han, med ret veludviklede Testes, er 60 cm. langt.

Det er blevet mig fortalt, at omtrent samtidig er der blevet fanget endnu et Eksemplar af denne Fisk af en anden islandsk Trawler, paa samme Lokalitet, men Vished for det har jeg ikke kunnet faa.

De ovenfor omtalte fire Eksemplarer er de eneste med Sikkerhed fundne Individer af denne Art ved Island, d. v. s. indenfor 220 Fv.'s (400 m.) Dybdekurven, den Grænse jeg i mit ovenfor citerede Arbejde valgte for de deri behandlede Bundfiske. Det nærmeste Sted ved Island, den før er blevet fundet paa, er, ifølge Jensen[1]), 64° 58′ N. Br., 11° 12′ V. L. (58 Kvml. Ø. for Gerpir,

[1]) Jensen, Ad. S., The North-European and Greenland Lycodinæ. The Danish Ingolf Exped. Vol. II, 4. S. 33.

Islands østligste Pynt), 300 Fv.'s Dybde, i et 383 mm. langt Eksemplar.

Dimensionerne af disse 4 Eksemplarer er (i Millimeter, jvfr. Jensen, op. cit.) følgende:

	1	2	3	4
Totallængde	505	541	556	600
Hovedets Længde	100	107	115	138
Afstanden fra Snudespids til Gat	198	210	234	238
Legemets Højde ved Gattet	58	65	65	75

Jeg har talt Finnestraalerne hos Eksemplarerne 2. og 3. og fundet: i D. 108 og 108, i A. 98 og 95, og i P. 25 og 23, altsaa for Rygfinnens Vedkommende et noget lavere Antal, end hvad Jensen angiver (nemlig 113—118).

Ifølge Jensen (op. cit., S. 28) forekommer denne Fisk i det nordlige Atlanterhav, fra Nova Scotia og Skotland til Finmarken og Beeren Eiland.

c. *Macrurus Fabricii* Sundev.

Af denne Fisk har vor Samling modtaget et enkelt Eksemplar fra Hr. Skolebestyrer St. Stefánsson. Det blev fanget paa Line i den dybe Rende ud for Mundingen af Eyjafjord (Eyjafjarðaráll), c. den 30. Juni 1910. Eksemplaret er en Han, med halvmodne Testes (Længde 70 mm., Bredde 30 mm.). Længden kan ikke angives nøjagtig, da den yderste Del (1—2 cm.) af Halen var brækket af. Det manglende fraregnet var den 79 cm. Finnernes Straaleantal er følgende: D.[1] 12, D.[2] 98 + ?, A. 104 + ?, P. 19, V. 8.

Udmaaling:

Totallængde	790 m. + ?
Afstanden fra Snudespids til Gat	325 mm.
— - — - D.[1]	207 —
— - — - A.	335 —
Hovedets Længde	165 —
Snudens — til Øjehulen	48 —

Øjehulens Længde	56 mm.
— Højde	50 —
Hagetraadens Længde	29 —
Længden af D.[1]	53 —
Højden - -	80 —
Afstanden mellem D.[1] og D.[2]	30 —
Den længste Straale i D.[2]	23 —
— — — i A.	48 —
Længden af Brystfinnen	88 —
— - Bugfinnen	55 —

Antallet af Skælrækker ovenfor Sidelinien er 5; de største Skæls Længde og Bredde er henholdsvis 14 og 10 mm.

Dette er det første og eneste Eksemplar af denne Fisk, som er fundet ved Island; den er en Dybvandsfisk, som forøvrigt forekommer ved Finmarken, Beeren-Eiland, Grønland og de Forenede Staters Østkyst[1]).

Eksemplaret findes nu udstoppet og opstillet i Samlingen i Reykjavik.

d. *Merluccius vulgaris* Flem. Kulmulen.

I Begyndelsen af November 1910 blev der bragt i Land i Reykjavik en stor og meget artsrig Fangst af Fisk, konfiskeret hos en tysk Trawler, som blev grebet i ulovligt Fiskeri et Steds ved Reykjanes-Halvøen. I denne Fangst blev der fundet og bragt mig fire Eksemplarer af denne Fisk, men de var desværre allesammen blevet slagtede, d. v. s. Bughulen aabnet og Indvoldene fjærnede, og da de desuden havde ligget en længere Tid paa en aaben Plads i Byen, udsatte for stærk Blæst og Tørke, var de

---

[1]) Efter at dette var nedskrevet, har jeg modtaget en meget udførlig Beskrivelse af en Fisk, som blev fanget paa Line d. 18. Juni 1912 (ca. 8 Kvml. N. O. af Hjedinsfjord (Eyjafjord)) paa ca. 100 Fv. Dybde. Beskrivelsen, som er givet af Hr. Distriktslæge Sigurjon Jónsson, er saa nøjagtig, at der ingen Tvivl er om, at den paagældende Fisk tilhører denne Art. Den var 80 cm. lang. Det er ikke umuligt, at jeg endnu kan faa idetmindste Skind og Knogler af Fisken.

ogsaa skrumpet betydelig ind. Længden af disse Fiske var henholdsvis 78, 80, 87 og 88 cm., altsaa nogenlunde udvoksne Individer.

Ifølge Oplysninger, jeg fik i det tyske Konsulat, skal Skibet paa paagældende Tur kun have fisket ved Island, hvorved den Mulighed maa anses for udelukket, at Fisken skulde være blevet fanget i sydligere Farvande. Endvidere fik jeg at vide, at Skibet havde taget en stor Del af Fangsten i Dybet Nord for Fugleskærene (Eldey), hvad ogsaa dens Beskaffenhed tydede paa, da den for en ikke ringe Del bestod af Lange (*Molva vulgaris* og *byrkelange*), Glashvarre (*Zeug. megastoma*) og andre Fiske fra dybere Vand. Jeg vil derfor antage, at alle disse Eksemplarer er fanget netop paa nævnte Lokalitet, paa 80—90 Fvn. Vand, en af de sidste Dage i Oktober.

Finnestraalernes Antal var hos to af Eksemplarerne følgende:

D.[1]	D.[2]	A.	P.	V.	C.
10	40	36 eller 37,	15	7	?
10	38	37	14	7	?

Disse fire Eksemplarer af Kulmulen er, saavidt jeg véd, de første, som er blevet bragt i Land paa Island. Muligvis har der været nogle flere blandt den omtalte Fangst. Men det er ret sandsynligt, at Fisken oftere er blevet fanget af fremmede Trawlere og Linefiskere under Syd- og Sydvestkysten og bragt til Udlandet. Jeg véd to Tilfælde, hvor den skal være blevet fanget før: det ene paa en islandsk Trawler, hvis Skipper fortalte mig, i Anledning af dette Fund, at han havde faaet én, netop paa ovenfor omtalte Sted. Det andet var ombord i en engelsk Trawler i Nærheden af Vestmannøerne. Min Hjemmelsmand, forhenværende anden Styrmand paa Havundersøgelsesskibet „Thor“, var den Gang én af Trawlerens Besætning. Endelig skal der i Efteraaret 1911 af en islandsk Trawler være blevet fanget ét Eksemplar i Nærheden af Vestmannøerne.

Efter dette at dømme lader det til, at Kulmulen ikke er saa ganske sjælden ved Sydvestkysten af Island. Muligvis er den, ligesom Makrellen, kun en Gæst, der aflægger Islands varmere Far-

vande Besøg under den varmere Aarstid, efter endt Gydning; maaske opholder den sig til Stadighed i disse Farvande som yngre, umoden Fisk, og trækker saa hen til sine Fødeegne, naar den er fuldmoden og Kønsdriften vaagner (jfr. Torskens Strejftog til Ishavet, under den varmere Aarstid). — Det er ikke sandsynligt, at den skulde gyde ved Island, siden Nordgrænsen for dens Gydningsomraade ifølge Schmidt[1]) ligger ved den nordlige Del af de britiske Øer.

e. *Gymnelis viridis* (Fabr.)

I et Brev til mig, dateret d. 15. Februar 1911, giver Hr. Museums-Assistent Ad. S. Jensen mig følgende Meddelelse: „Ved at revidere vort grønlandske og islandske Fiskemateriale finder jeg en for Island „ny" Fisk, nemlig *Gymnelis viridis*". Og han føjer til: „Eksemplaret, der er 103 mm. langt, og af den ensfarvede Varietet, er endda taget allerede 1890 af Wandel i Skagestrandsbugten, paa 114 Fv.'s Dybde, blød Bund og Tp. 2,9° C. Dette Fund har mere end almindelig Interesse, da Fisken er en udpræget Koldtvandsform, hidtil ikke kendt fra Evropas Fastland, men ellers circumpolar (Vest- og Østgrønland, Jan Mayen, Spitsbergen, Barents Havet, Kara Havet, Sibiriens Ishav, samt arktisk Nordamerika fra Beringshavet til Nova Scotia)."

Denne Meddelelse var Hr. Jensen saa elskværdig at stille til min Raadighed, ligesom en lignende om næstfølgende Fisk[2]). — Fisken var desværre kun tilstede i et enkelt Eksemplar, det første, som er fundet i Nærheden af Island.

f. *Motella Reinhardti* (Kröyer).

Ogsaa denne Fisk er, ifølge en Meddelelse fra Hr. Ad. S. Jensen, dateret d. 4. September 1911, blevet fundet af ham ved Undersøgelsen af ovenfor omtalte Materiale af grønlandske og is-

[1]) The distribution of the pelagic fry and the spawning regions of the Gadoids etc. Cons. internat. pour l'expl. de la mer, 1909, Vol. X., n. 4. S. 145.

[2]) For denne Tjeneste beder jeg Hr. Jensen herved modtage min bedste Tak.

landske Fiske, men ligeledes kun et enkelt Eksemplar. Fisken, som ifølge Jensen er et mindre, 145 mm. langt Individ, blev taget af daværende Kaptain Wandel, ved samme Lejlighed og paa samme Sted som den ovenfor omtalte *Gymnelis viridis*.

Dette er det første Fund af denne Fisk inde paa den islandske Landgrund, ɔ: indenfor 200 Favne-Kurven, thi den er tidligere ikke fundet nærmere ved Island end 56 Kvml. Ø. for Langanæs, og det kun i Maven af en Torsk, der blev fisket intermediært ombord paa "Thor" (jvfr. mit før citerede Arbejde, S. 64). Min, paa nævnte Sted fremsatte, Formodning om dens Forekomst nærmere ved Island har saaledes vist sig at være rigtig.

Det er interessant at lægge Mærke til, at denne Lokalitet, hvor disse to Fiske blev taget, lader til at være rig paa arktiske Fiske, som kun sjælden er fundne ved Island, idet Wandel, foruden disse to her omtalte Fiske ogsaa fik to andre sjældne, nemlig *Artediellus uncinatus* og *Icelus bicornis* (Jvfr. min Oversigt, S. 19).

g. *Galeus vulgaris* Flem., Graahajen.

Af denne Fisk blev der fanget et enkelt Eksemplar paa 15 Fv.'s Dybde ud for Grindavik (Reykjaneshalvøens Sydkyst), den 12. August 1911. Det var en nogenlunde udvokset, 142 cm. lang Hun, med veludviklede Ovarier. Det traf sig saa heldig, at jeg besøgte Pladsen 3—4 Dage efter, at Fisken blev fanget, saa at jeg kunde faa fat i den, faa den maalt og flaaet, inden den blev ødelagt, hvad der ellers snart vilde være sket i Sommervarmen, og saa vilde det være blevet umuligt at faa Fisken identificeret, om jeg muligvis senere havde en mangelfuld Beskrivelse af den. Nu er den opstillet i den naturhistoriske Samling i Reykjavik.

Udmaalinger:

Totallængde	1420 mm.
Afstanden fra Snudespids til Mund	95 —
— - — - 1. Gællespalte	215 —
— - — - Brystfinnen	270 —

Afstanden fra Snudespids til 1. Rygfinne	....	480 mm.
— - — - Bugfinnen	......	740 —
— - — - Gattet	....	742 —
— - — - Gatfinnen	......	942 —
— - — - 2. Rygfinne	....	950 —
Brystfinnens Længde	....	200 —
Bugfinnens —	....	63 —
1. Rygfinnes Længde (ved Grunden)	....	127 —
1. — Højde	....	102 —
2. — Længde	....	60 —
2. — Højde	....	42 —
Gatfinnens Længde	....	53 —
— Højde	....	42 —
Øjehulens Længde	....	40 —
1. Gællespaltes Højde	....	33 —

Dette er det første og eneste Tilfælde af, at Graahajen er fundet ved Island[1]). Muligvis strejfer den oftere der op om Sommeren, skønt man ikke før er blevet den var[2]). De stedlige Fiskere ansaa den nærmest for at være en ung Sildehaj (*Lamna cornubica*).

Supplerende Oplysninger om tidligere kendte, sjældne Fiske.

1. *Centrolophus britannicus* Gthr.

(Tavle I.).

I min Oversigt over Islands Fiske har jeg (S. 11) givet en meget kortfattet Meddelelse om denne Fisks Forekomst ved Island

[1]) Jeg vil her gøre den Bemærkning, at der i Atlas'et til Gaimards Rejseværk (Voyage en Islande et au Groenland etc.) staar afbildet en *Galeus canis* (= *G. vulgaris*), men uden Lokalitetsangivelse. Men da denne ellers altid staar angivet („Islande“), naar vedkommende Afbildning er af en islandsk Fisk, saa vil jeg antage, at denne *Galeus canis* har hørt andre Steder hjemme.

[2]) Denne Formodning er allerede bleven bekræftet, siden dette blev skrevet; thi nu i Juli Maaned, mens jeg var bortrejst, blev en 134 cm. lang Hun fanget i Stenbidergarn ved Reykjavik. Jeg har kun set den flygtig, opbevaret i et Frysehus, da den endnu ikke er bleven erhvervet til Samlingen.

(ét Eksemplar drevet paa Land i Grindavik d. 7. Marts 1905). Da denne Fisk før kun var kendt i et enkelt Eksemplar fra Cornwalls Kyst, og senere, saavidt jeg ved, ikke er fundet andre Steder, saa synes jeg, at der er god Grund til at give en nærmere Beskrivelse af det islandske Eksemplar, ledsaget af en Afbildning af dette, saa meget desto mere, som Günthers Beskrivelse af Arten, saa vel som Day's Afbildning[1]) af Typeeksemplaret er baseret paa det (ifølge Day daarlig) udstoppede Skind af Fisken, som vistnok endnu opbevares i British Museum.

Beskrivelse:

Legemsform. Denne Fisk, som hører til Stromateidernes Familie, har, ligesom andre af denne lille Families Medlemmer, et højt og stærk sammentrykt, elliptisk Legeme. Dens Totallængde (regnet til Spidsen af de længste Halefinnestraaler) er 445 mm. Legemet har sin største Højde, 110 mm. ved Gattet; Forholdet imellem Legemets Højde og Længde bliver saaledes omtrent 1:4. Legemets største Tykkelse, 32 mm., findes lige bagved Øjnene. Hovedets Længde er 80 mm., og gaar saaledes $5^1/_2$ Gang op i Totallængden. Halen er paa sit smalleste Sted 22 mm. høj, eller $^1/_5$ Del af Legemets største Højde. Gattet er beliggende omtrent midt imellem Snudespidsen og Halefinnens Rod. Andre Dimensioner vil ses af nedenstaaende Udmaalinger.

Hovedet er kort og højt; dets største Højde er omtrent $^3/_4$ af dets Længde. Snuden meget kort og afrundet, med stærkt konveks Profil; dens Længde er omtrent lig med Øjets Diameter. Underkæben række næsten lige saa langt frem som Overkæben. Øjnene er store og omgivne af en temmelig bred, radiært rynket Hudfold. Øjeaabningen er cirkelrund, og dens Diameter gaar omtrent $4^1/_2$ Gang op i Hovedets Længde. — Det bageste Næsebor har sin Plads omtrent midt imellem Øjet og Snudespidsen og er skilt fra det forreste ved en meget smal Hudbro. — Forgællelaagets Bagrand er stærkt buet og af finneagtigt Udseende, idet

---

[1]) F. Day: The Fishes of Great Britain and Ireland, 1880—84. vol. I, S. 110—111, Pl. XL. 1.

den er meget tynd og støttet af straaleagtige Fortykkelser, som løber ud i korte Spidser; Gællelaagets Rand er endnu tyndere og ligesom cilieret af bløde og bøjelige Takker.

Munden er af Middelstørrelse og næsten horizontal; Mundspalten rækker knap nok under Overkæben lidt forbi Øjets Midte. Tænderne smaa, indtil 0,7 mm. høje, cylindriske, spidse, og findes kun paa Kæberandene, i 2—3 Rækker paa Mellemkæben, i én Række paa Underkæben. Fra Overkæben gaar der en halvmaaneformet c. 6 mm. bred Hudfold ind i Mundhulen. — Takkerne paa første Gællebue er lange og kraftige; deres Antal er 12 + 5, og de længste er 8 mm. lange. Paa de tre øvrige Buer er de korte og tykke, deres Antal henholdsvis 10 + 5, 9 + 3 og 9 + 2. Gællehinderne er fri, hverken sammenvoksede indbyrdes eller med Isthmen. Gællehudstraalerne er 7.

Sidelinien er overalt meget tydelig. Over Brystfinnen danner den en svag Bue, som rækker til omtrent midt imellem Bugfinnens Spids og Gattet; herfra løber den i næsten lige Linie hen til Halefinnens Grund.

Brystfinnerne er temmelig korte (men dog forholdsvis meget længere end paa Day's Afbildning), idet deres længste Straaler kun er 30 mm. lange, eller omtrent lig med Rygfinnens længste Straaler. De er 14 mm. brede ved Grunden og har 21 Straaler, hvoraf de midterste er de længste (Finnen tilspidset, med afrundet Spids); de yderste er enkelte, de andre én Gang eller to Gange kløvede.

Bugfinnerne har deres Plads lidt foran Brystfinnernes Fæste, de er temmelig korte, 18 mm., og indeholder 1 + 5 Straaler.

Rygfinnen er meget lang; den begynder lige over Gællelaagets bageste Hjørne og strækker sig henimod Halefinnen, fra hvilken den er skilt ved et c. 55 mm. langt Mellemrum. Den har 46 Straaler, hvoraf de første 15 er enkelte og bløde, medens de andre er kløvede. De forreste af Straalerne er korte, de midterste, der er 32 mm., de længste, medens de bageste er 15 mm. lange. Rygfinnens største Højde gaar saaledes $3^1/_2$ Gang op i Legemshøjden.

Gatfinnen ligner Rygfinnen, men er kun lidt over halv saa lang som denne. Den begynder tæt bagved Gattet og rækker ligesaa langt tilbage som Rygfinnen. Den har 25 Straaler, hvoraf de 10 første er enkelte, men bløde, de andre en Gang kløvede. De midterste Straaler er de længste, 30 mm., den bageste 18 mm.

Partiet, som indeslutter Ryg- og Gatfinnens Straalebærere, er temmelig tyndt, og ved en lav Fure afsat fra Halens og Ryggens Muskelpartier.

Halefinnen er veludviklet og ret dybt kløvet med spidse Hjørner. Den har ialt 31 eller 32 (7 + 16 + 8 eller 9) Straaler; de længste af disse er 79 mm., de midterste kun 40 mm. Mellemrummet mellem de to midterste Straaler er paafaldende bredt.

Skællene er smaa Cycloidskæl, elliptiske af Form, med 25—40 koncentriske Ringe, men uden radiær Stribning. De største er 4 mm. lange og 2,5 mm. brede. Skælbeklædningen strækker sig (saa vidt det, paa Grund af Hudafskrabninger, kan skønnes) over hele Hovedet og ud paa alle Finner, men danner, saa vidt jeg kan se, ingen Skede, som dækker en stor Del af Ryg- og Gatfinnen, saaledes som det fremstilles hos Day.

Farven var ensfarvet mørk-chocoladebrun, da jeg fik Fisken, saavel paa Krop og Finner som indvendig i Mund- og Gællehule og paa Bughinden.

Antallet af *Appendices pyloricæ* er 9; 4 af dem er enkelte og meget lange (200 mm.), medens de 5 øvrige er korte og gentagne Gange forgrenede.

Eksemplaret var en Han. Testes meget lidt udviklede, c. 100 mm. lange og 3—4 mm. brede.

Udmaalinger:

Totallængde	445 mm.
Afstanden fra Snudespids til Gat	170 —
Hovedets Længde (til Hjørnet af Gællelaaget)	80 —
— Højde ved Øjnene	56 —
Øjets Diameter	18 —

Overkæbens Længde	25	mm.
Hovedets Postorbitaldel	36	—
Legemets største Højde	110	—
— Højde ved Hovedet	88	—
— — ved Midten af Gatfinnen	85	—
Halens mindste Højde	22	—
Rygfinnens Længde	235	—
Gatfinnens —	130	—
Brystfinnens —	30	—
Bugfinnens —	18	—
Halefinnens —	77	—

Finnernes Straaleantal er: D. 46, A. 25, C. 31 (32), P. 21, V. 6.

Naar disse Maal sammenlignes med de af Day (og Couch) angivne Maal paa Originaleksemplaret, saa stemmer de ganske godt overens. Det samme kan ogsaa siges om Finnestraalernes Antal, naar Gatfinnen undtages, hvor Antallet er betydelig højere end hos det islandske Eksemplar. Men trods denne, og muligvis andre, mindre Afvigelser i mellem disse to Eksemplarer gør man vel rettest, i det mindste foreløbig, i at anse dem begge for hørende til samme Art.

2. *Aphanopus Schmidti* B. Sæm.

Jeg beskrev denne Fisk som en ny Art i Vidensk. Meddel. 1907, S. 22—26. Den Gang kendte jeg kun et enkelt Eksemplar, som blev fundet drevet i Land paa Vestmannøerne i 1904. Saa fik jeg fra Vestmannøerne Melding om, at man havde fanget 5 Eksemplarer af denne Fisk paa 140 Fv. SSV. af Bjarnarey, den 1. Marts 1909. Af disse Fiske blev de tre ødelagte, mens to blev erhvervede for vor Samling. Senere er det ene af disse blevet afstaaet til det zoologiske Museum i København. Begge Eksemplarerne var Hunner, med umodne Ovarier.

Disse to Fiske befandt sig i den bedste Forfatning, da jeg fik dem (de havde været opbevarede paa Fryseriet paa Vestmannøerne, indtil de blev afsendt); jeg kunde derfor faa en rigtigere

Forestilling om denne Fisks virkelige Udseende og forskellige Forhold, som jeg tildels havde mistydet paa Originaleksemplaret, da dette var ikke saa lidt medtaget, da jeg fik det i Hænde.

Det, som jeg særlig blev opmærksom paa, var, at jeg maatte have mistydet de af mig omtalte Mærker efter Skæl paa Originaleksemplaret, da begge disse ny Eksemplarer ganske savnede den Slags Mærker. Jeg kan godt sige, at jeg ingenlunde var veltilfreds med den Forklaring, at disse Mærker skulde være efter affaldne Skæl, uden at jeg dog kunde finde nogen bedre Forklaring (tænkte dog paa Parasiter). Dr. J. Grieg i Bergen har for nylig[1]) gjort opmærksom paa Urigtigheden i denne Tydning og tyder selv disse Mærker som Indtryk efter en Blæksputtes Sugeskaale, i Lighed med hvad man har fundet paa Kaskelottens Hud, en Tydning, jeg for min Del finder meget sandsynlig.

For det andet fik jeg at se, at Fisken i uskadt Tilstand er overalt énsfarvet mørk-chocoladebrun; den sølvgraa Farve, som Originaleksemplaret havde flere Steder, skyldtes blot den Omstændighed, at Hudens yderste mørkfarvede Lag var blevet skrabet af.

Halefinnens Form er omtrent den samme som den, jeg formodede og antydede paa min Tegning.

I disse to Eksemplarer var alle Indvolde i Behold, og jeg vil bemærke, at Svømmeblæren strækker sig fra Hovedet til omtrent midt imellem dette og Gattet. Antallet af *Appendices pyloricæ* er 7 hos den ene af Fiskene, 5 hos den anden.

Jeg maalte begge disse Eksemplarer paa samme Vis som det første og sætter Maalene her, tillige med før anførte Maal af dette, som sættes i første Kolonne.

	mm.	mm.	mm.
Totallængde	950	927	1030
Afstanden fra Snudespids til Gattet	510	500	586
Hovedets Længde til Spidsen af Underkæben	185	182	192
— — - — - Overkæben	178	175	178

[1]) Ichthyologiske Notitser III. Bergens Museums Aarbog 1911, Nr. 6, S. 10.

	mm.	mm.	mm.
Hovedets Højde over Øjnene	56	54	61
Afstanden fra Øjet til Overkæbens Spids	80	71	75
— - — - Næseboret	16	15	18
Øjets Diameter	31	32	35
Mellemkæbens Længde (Overkæbe indbef.)	86	80	86
Underkæbens Længde	120	109	120
Hovedets Postorbitaldel	70	67	74
Legemets største Højde	90	79	92
Legemets Højde ved Enden af Hovedet	79	70	81
— — — Gattet	71	68	73
— — — Midten af Gatfinnen	56	49	52
— — — Halefinnen	5	5	5
1. Rygfinnes Længde	365 [1])	355	400
2. — —	363	340	395
Brystfinnens —	76	76	76
Analdolkens —	22	19	22

Finnestraalernes Antal forholder sig saaledes hos de tre Eksemplarer (Originaleksemplaret i øverste Linie):

D.[1] 37 [1]),	D.[2] 54,	A. 46,	C. 24 (4 + 16 + 4),	P. 12.
- 39,	- 53,	- 45,	- 25 (5 + 16 + 4),	- 12.
- 40,	- 53,	- 46,	- 26 (5 + 16 + 5),	- 12.

Naar disse Oplysninger føjes til min Beskrivelse af Originaleksemplaret, saa maa det vel siges, at denne Fisks Udseende nu er nogenlunde godt kendt.

Jeg kunde nu lade det være nok med dette, hvis ikke Hr. Grieg ved en Sammenligning af et Eksemplar af *Aphanopus carbo*, fra Danmarksstrædet, som han beskriver udførlig i ovenfor citerede Afhandling, med min *Aph. Schmidti* uden videre slog denne sammen med *A. carbo* som artsidentisk med den og derved benægtede Berettigelsen af at opstille den som en selvstændig Art.

[1]) Det viste sig nemlig, at den lille Straale, som jeg opfattede som 1. Straale i 2. Rygfinne, virkelig er den sidste i 1. Rygfinne, men skilt fra den ved en Læsion.

Men dette kan man, efter min Formening, næppe afgøre med Sikkerhed, naar man ikke har et større Materiale til Sammenligning end det, Grieg har haft, nemlig det omtalte Eksemplar fra Danmarksstrædet og min Beskrivelse og Afbildning af den anden Art i Vidensk. Meddel.

Sin Opfattelse af disse to Arter som identiske (synonyme) baserer Grieg hovedsagelig paa den Omstændighed, at Finnestraalernes Antal hos begge Eksemplarer er omtrent det samme for alle Finners, undtagen Gatfinnens Vedkommende, hvor Antallet er betydelig lavere hos hans *A. carbo* end hos min *A. Schmidti*, nemlig 39 i Stedet for 46. Antallet af Finnestraalerne hos begge er følgende:

A. carbo, D.[1] 37, D.[2] 54, A. 39, C. 24, P. 12.
A. Schmidti, D.[1] 37, D.[2] 56, A. 46, C. 24, P. 12.

og naar de to ovenfor omtalte ny Eksemplarer af *A. Schmidti* tages med, saa bliver Forskellen lidt større. At bygge Artsidentiteten paa Ligheden i Finnestraalernes Antal, synes jeg er lidt usikkert, især naar man kun har ganske faa Eksemplarer til Sammenligning. Antallet af Finnestraaler kan være temmelig lignende hos Former, som almindelig anses for vel adskilte Arter. (Jeg vil eksempelvis nævne *Clupea alosa* og *Cl. finta*, hvor Antallet ifølge Lilljeborg[1]) er omtrent det samme, og imellem Arter af Slægterne *Cottus*, *Gadus* og *Pleuronectes* er Forskellen ikke altid stor).

Farven hos *A. Schmidti* viser sig paa de ny Eksemplarer at være omtrent den samme som paa *A. carbo*, altsaa én Lighed mere, men jeg tror nu ikke, at Farven hos disse Dybvandsfiske har meget at sige som Artsmærke, og er tilbøjelig til at tro, at de hidtil beskrevne Eksemplarer af Slægten *Aphanopus* i uskadt Tilstand har været mørkfarvede. Steindachner beskriver[2]) f. Eks. sin Art, *A. Simonyi* som: "Hell silbergrau, etwas dunkler am Kopfe, dunkelviolett im hintersten Theile des Rumpfes und auf dem Cau-

---

[1]) Sveriges och Norges fiskar III, S. 113 og 120.
[2]) Ichthyol. Beiträge (XV), Sitzungsber. d. kaiserl. Akademie der Wissensch. in Wien, Math.-naturw. Classe, Bd. C. Abth. I. 1891.

dale". Mon ikke denne dunkelviolette Farve paa Kroppens bageste Del tyder paa, at hele Kroppen oprindelig netop har haft denne Farve, og at den er blevet skrabet bort (som paa mit Originaleksemplar).

Efter at jeg nu har omtalt de vigtigste Lighedspunkter, vil jeg fremhæve de Forhold, hvori jeg finder Uligheden størst imellem disse to Arter, og skal først fremhæve, at det, da jeg sammenlignede min Fisk med Günthers Beskrivelse og Afbildning af *A. carbo*[1]), aldrig faldt mig ind, at den kunde henføres til den Art, thi bl. a. var dens 1. Rygfinne forholdsvis meget lavere[2]), end den skulde være hos *A. carbo*, dens Hoved kortere og dens Øjne mindre.

Naar jeg nu sammenligner mine 3 Eksemplarer med Griegs Beskrivelse og Afbildning (som desværre kun omfatter Hovedet og den forreste Del af Kroppen) af hans Eksemplar af *A. carbo*, saa finder jeg straks den samme Forskel: Hos Griegs Ekspl. er 1. Rygfinnes største Højde (længste Straale) 39 mm., Legemets største Højde 83 mm.; Finnens Højde altsaa næsten Halvdelen af Legemets Højde. Hos *A. Schmidti* er samme Finnes Højde kun lidt over en Tredjedel af Legemets største Højde (39 : 90).

Hos Griegs Eksemplar er Hovedets Længde (maalt fra Spidsen af Overkæben) c. $^1/_5$ af Totallængden (1 : 5,05), hos mit (maalt paa samme Maade) betydelig mindre (1 : 5,34). Desuden er Legemet betydelig mere langstrakt, idet dets største Højde naar ikke $^1/_{12}$ af Længden, medens denne hos *A. Schmidti* er $10^1/_2$ Gang saa stor som Hovedets Længde. Endvidere er Brystfinnen forholdsvis betydelig længere hos *A. carbo*; den er længere end Legemets største Højde (88 : 83), men hos *A. Schmidti* betydelig kortere (76 : 90).

Det større Antal Straaler i Gatfinnen er allerede blevet omtalt; men da Grieg mener, at nogle af Straalerne er gaaet tabt, saa vil jeg ikke tillægge det nogen større Betydning.

---

1) Challenger Report. Vol. XXII. S. 210, Pl. VII.
2) Paa min Afbildning er denne Finne tegnet lidt for lav.

Saa er der Øjnene. Ved en flygtig Sammenligning af begge Afbildninger sés det allerede tydelig, at Øjnene hos Griegs Ekspl. er forholdsvis meget større. Deres lodrette Diameter er mere end Halvdelen af Hovedets største Højde, medens den hos *A. Schmidti* gaar $2^1/_3$ Gang op i denne. Øjnenes Længdediameter gaar henholdsvis $25^1/_2$ og $30^2/_3$ Gange op i Totallængden.

Hos Griegs Eksemplar skal der findes en lille, 4 mm. lang Pig foran Analdolken. Hos *A. Schmidti* finder jeg kun en lille c. 1 mm. høj Knude paa dette Sted.

Om Tænderne kan det fremhæves, at de er tildels meget mere udviklede og flere hos *A. Schmidti* end hos Griegs Ekspl., hvad der tydelig ses ved Sammenligning af begge Afbildninger; men antagelig er flere af dem faldne ud hos det sidstnævnte Eksemplar[1]). Jeg vil eksempelvis fremhæve, at Fangtændernes Længde hos *A. Schmidti* naar 13 mm., medens de hos Griegs *A. carbo* kun er 10 mm.

Endelig vil jeg fremhæve, at der er en meget betydelig habituel Forskel, naar man sammenligner Afbildningerne af de to Hoveder. Paa Griegs er det meget kantet og knoglet, hos *A. Schmidti* meget blødere i Linierne, ligesom ogsaa Snudens Form er ret forskellig.

Jeg har nu fremhævet de Forhold, i hvilke jeg finder Forskellen imellem Griegs Eksemplar af *A. carbo* (og dermed denne Art i sin Helhed) og *A. Schmidti* særlig udtrykt, og jeg synes ikke, at der er nogen Grund til uden videre at slaa min Art sammen med *A. carbo*. Det kan godt tænkes, at man ved Kendskab til et større Materiale vil komme til det Resultat, at begge Arter er identiske; men saalænge det Materiale ikke foreligger, vil jeg fastholde min Opfattelse af de tre af mig undersøgte og beskrevne Fiske som en selvstændig og velbegrundet Art.

---

[1]) Ved nærmere Eftersyn viser det sig, at ogsaa hos *A. Schmidti* er de fint krenulerede i Randen, dog kun i deres yderste Halvdel.

3. *Trachypterus arcticus* (Brünn.). Vaagmæren.

I min Oversigt, S. 25, har jeg anført alle de Tilfælde, som jeg har faaet Oplysninger om, hvor Vaagmæren er blevet iagttaget ved Islands Kyster i den sidste Snes Aar. Det blev gennemsnitlig godt og vel ét Tilfælde om Aaret. — Siden er der forefaldet ikke faa Tilfælde, som jeg har faaet Oplysninger om, og jeg synes, det har sin Interesse at publicere dem her, for at man bedre kan danne sig et Begreb om denne ejendommelige Dybvandsfisks Forekomst ved Island.

Disse Tilfælde anført i kronologisk Orden er følgende:

Den 31. Maj 1909 strandede et Eksemplar paa Akranes over for Reykjavik. Jeg fik det at se; det var en 220 cm. lang Hun, med 65 cm. lange, nylig udlegede Ovarier og meget fed Lever. — I Foraaret 1909 strandede der, ifølge en Meddelelse fra Hr. Cand. theol. L. Thorarensen 3 Individer henholdsvis d. 6. og d. 14. Mai og d. 16. Juni, hvoraf et levende, ved Byen Isafjord. — Den 27. Juni s. A. strandede, ifølge en Meddelelse fra en Mand paa Stedet, et 233 cm. langt Eksemplar i Hjeðinsfjord (Eyjafjords Munding). Den 10. September s. A. strandede, ifølge en Meddelelse fra Hr. Skolebestyrer St. Stefánsson, et ganske ubeskadiget Eksemplar ved Akureyri. — Endelig drev et Eksemplar op i Miðfjord (Hunabugten) d. 18. Dec. s. A.; det var 1$^1/_2$ Alen langt, ifølge en Meddelelse fra en Mand, som i to Somre assisterede mig paa mine Motorbaad-Rejser langs Nord- og Vestkysten.

Fra 1910 kender jeg kun to Tilfælde: Der blev fundet et Eksemplar skyllet op i Bygden Hraun paa Sydkysten af Faksebugten, d. 20. Jan. Dette Eksemplar saa jeg; det var 150 cm. langt. — I Februar samme Aar blev et Individ fundet nær ved Handelsstedet Vatneyri i Patriksfjord.

I Foraaret 1911, d. 14. Mai, strandede et levende Eksemplar paa Heimaey, Vestmannøerne. Det var en c. 160 cm. lang Hun, som blev sendt til Samlingen i Reykjavik. — Den 19. i samme Maaned blev en Vaagmær fanget i Trawl i den sydlige Del af Faksebugten; det var et ungt, c. 1 m. langt, men stærk beskadiget

Individ. — I September samme Aar fandt man én i Nærheden af Gaarden Teigarhorn ved Berufjord (Østkysten). Den skal, ifølge en Meddelelse i et Brev til en af mine Bekendte, have været 3 Alen og 3 Tommer lang. — En Gang i Efteraaret 1911 skal 7 Eksemplarer være fundet samtidig ved Isafjord, men nærmere Oplysninger har jeg ikke faaet.

Fra indeværende Aar (1912) kender jeg allerede 4 Tilfælde: Den 12. Juni blev én skyllet op ved Langarnes Øst for Reykjavik. Den var ganske ubeskadiget og skal have været lidt over 3 Alen lang. — Den 25. i samme Maaned fandt man et $2^{1}/_{2}$ Alen langt Eksemplar ved Borgarnes Handelsplads (Faksebugten). Det blev beskrevet for mig i Telefon. Jeg saa det aldrig. — En Gang i Juli fandt man én opskyllet i Grindavik (Sydvestkysten), og omtrent paa samme Sted fandt man en anden d. 16. August. Jeg saa dette Eksemplar; det var omtrent 2 m. langt og lidt større end det første og ligesom dette stærkt beskadiget.

I Løbet af de sidste 3—4 Aar har jeg saaledes faaet at vide om 23 Eksemplarer af Vaagmæren, som er strandet (levende) eller skyllet op (døde) paa forskellige Steder paa Islands Kyster, og sikkert er der forekommet endnu flere, om hvilke jeg til Dato ingen Oplysninger har faaet. Særlig har Tilfældene været mange i 1909. Naar man sammenholder dette med det, som jeg før har meddelt (l. c.) om Vaagmærens Forekomst ved Island, saa kan man med god Grund betegne den som en ret hyppig Fisk ved Island.

Disse Fund giver ikke ret mange Oplysninger om Vaagmærens biologiske Forhold. Nogle Gange er den fundet levende (døende) i Stranden, hvad der tyder paa, at den vistnok som oftest, ogsaa i Tilfælde, hvor den er fundet død, har forvildet sig fra de store Dybder, hvor den vistnok som Regel lever, ind paa lavere Vand, og svag som den er, af Sø, Vind eller Strøm er blevet drevet ind til Kysten, hvor den saa er strandet. Jeg har kun haft Lejlighed til at undersøge faa af de fundne Eksemplarer. Om dens Føde har jeg ingen Oplysninger faaet, da Maven altid har været tom. Et 206 cm. langt Individ, fundet ved Reykjavik d. 14. Juni 1908



B. Sæmundsson del.

Centrolophus britannicus Gthr. ♂.

Typ. Bianco Luno.

(omtalt l. c.) havde smaa (udlegede) Testes, og Eksemplaret fra Akranes havde, som allerede omtalt, udlegede Ovarier. Dette tyder paa, at Gydetiden maa vel være en Gang om Foraaret. De af mig undersøgte Eksemplarer, som kun har haft en Længde af 1 m., eller lidt derover, har haft ganske uudviklede Generationsorganer og har altsaa været umodne.

4. *Notacanthus nasus* Bloch.

Jeg har i min Oversigt, S. 26 omtalt det eneste Tilfælde, hvor denne sjældne Fisk den Gang var fundet ved Island. Denne Gang har jeg et nyt Tilfælde at meddele, idet et Eksemplar af den blev fundet opskyllet paa Heimaey, Vestmannøerne, i August 1909, men desværre meget beskadiget, indtørret, den ene Side næsten helt borte og Halespidsen brækket af. Ved Opblødning lykkedes det dog min Præparator at fremstille et forholdsvis vellykket, udstoppet Eksemplar af Resterne.

Jeg henfører dette Eksemplar til Arten *Notacanthus nasus* Bloch, endskønt det i enkelte af de Forhold, som dets daarlige Forfatning tillader mig at undersøge, afviger en Del fra de hidtil (meget faa) beskrevne Eksemplarer af Arten. Jeg vil her give en kort Beskrivelse af mit Eksemplar, for at det kan sammenlignes med Beskrivelsen af ældre, før kendte Eksemplarer af *N. nasus*.

Jeg skal først bemærke, at Totallængden (i Fiskens nuværende Tilstand) er 915 mm., foruden den afbrækkede Halespids. Hovedets Længde er 125 mm., Afstanden imellem Snudespids og Øje er 35, mellem Snudespids og Bugfinner 330, mellem Snudespids og Rygfinne 345 og mellem Snudespids og Gat 405 mm. Hovedets største Højde er 62, Legemets Højde ved Brystfinnen 68, ved Gat 70 mm., men har sikkert været c. 10 mm. større, da Skindet er betydelig indskrumpet. — Munden rækker hen til Øjets Midte, og Mellemkæbebenet ender i en udadbøjet Spids, der rager 9 mm. uden for Huden. Paa Mellemkæbebenet har der (paa hver Side) været 36 Tænder i en enkelt Række, men de er alle borte, lige som i Underkæben, hvor der har været 3 Rækker Tænder, med 30 Tænder

i inderste, 22 i midterste og 7 i yderste Række. Ganeben og Plovben bærer ingen Mærker efter Tænder. — Skællene er smaa, de største c. 4 mm. lange og 3,6 mm. brede, med utydelige Vækstlinier (jeg kunde tælle 5—6 Vinterlinier). De danner 15—17 Rækker ovenfor Sidelinien, ved Midten af Rygfinnen. — Sidelinien følger nogenlunde Legemets øvre Kontur i en Afstand fra denne, som paa Midten udgør c. 1/3 af Legemshøjden; ca. 780 mm. fra Snudespidsen bliver den utydelig.

Rygfinnen er c. 210 mm. lang og bestaar af 12 (11 + 1) Pigge, hvoraf den sidste er temmelig tynd og nærmere ved den næstsidste, end Afstanden er i mellem de andre (som bliver indtil 20 mm.). Den skal ifølge Forfatterne være leddet (en Blødstraale), hvad jeg dog ikke kunde se paa det indtørrede Eksemplar. De andre Pigge er korte og tykke; de længste rager c. 5 mm. ud af Huden (maalt paa Piggens Bagside). Den første er ganske lille, næppe over 1 mm. lang.

Gatfinnen har 21 Pigstraaler, hvoraf de første 15 er ganske uleddede, men de 6 næste meget svagt leddede, og 107 leddede Blødstraaler; nogle faa er brækkede af sammen med Halefinnen. De længste af Straalerne er c. 50 mm., eller af samme Længde som Brystfinnen; denne har 14 Straaler, og Bugfinnen 3 + 7 Straaler (begge disse Finner mangler paa venstre Side).

Naar man sammenligner denne Beskrivelse med Beskrivelsen af andre Eksemplarer af denne Art, saa viser det sig tydelig, at der er størst Overensstemmelse med Lütkens Beskrivelse af det grønlandske Eksemplar[1]), og mit Eksemplar afviger kun i faa Forhold, som f. Eks. Antallet af Rygpigge og Pigstraaler i Gatfinnen, en Del fra dette. Rygpiggenes Antal er højere end hos de andre Eksemplarer, undtagen det Gaimard'ske, hvormed der (ifølge Afbildningen) er en fuldstændig Overensstemmelse.

---

[1]) Korte Bidrag til nordisk Ichthyographi II. *Notacanthus nasus*: Vid. Meddel. 1877. S. 145 ff.

Jeg synes ikke, at de omtalte Uoverensstemmelser mellem det af Lütken beskrevne grønlandske Eksemplar og Vestmannø-Eksemplaret giver nogen Grund til andet end at anse dette for artsidentisk med det grønlandske og derfor ogsaa med de andre Eksemplarer af *N. nasus*. Jeg haaber, at det maa lykkes de dygtige Vestmannøfiskere inden ret længe at bringe et bedre Eksemplar end det her omtalte af denne sjældne Fisk frem for Dagens Lys; thi jeg anser det for ret sandsynligt, at den, i det mindste til Tider, maa opholde sig paa de dybere Steder, hvor de plejer at fiske.

Den nærmeste Slægtning af denne Art, *N. Bonapartii* Risso, er ifølge Collett[1]) fundet c. 150 Km. NV. for Hebriderne og c. 180 Km. SV. for Færøerne, og ifølge Holt & Byrne[2]) paa 52° 7′ N., 11° 58′ V. og 51° 54′ N., 11° 57′ V.

5. *Phycis borealis* n. sp.

(Tavle II.).

I min Oversigt, S. 62, gav jeg en foreløbig Meddelelse om en *Phycis*-Art, hvoraf jeg havde faaet et Eksemplar fra Faksebugten (Jökuldjúp), hvor det blev fanget d. 23. Mai 1908, paa 60 Fv. Dybde, paa Haandsnøre ombord i en Fiskekutter; jeg modtog det i ganske uskadt Tilstand.

Jeg kunde den Gang ikke afgøre, hvorvidt denne Fisk var en ny Art, eller om den maaske kun var en Varietet af *Ph. mediterraneus* De la Roche, da jeg hverken havde Materiale til Sammenligning eller den nødvendige Litteratur til Spørgsmaalets Afgørelse. Nu da jeg har faaet de nødvendigste Beskrivelser af *Ph. mediterraneus*, samt et (omend lille) Eksemplar af denne Art fra Middelhavet[3]), saa er jeg i Stand til at afgøre Spørgsmaalet, for saa vidt det kan afgøres ved Sammenligning med det omtalte Eksemplar

[1]) Fiske indsamlede under „Michael Sars" Togter i Nordhavet 1900—1902. Rep. Norw. Fish. and Marine Invest. Vol. II, 1905, No. 3, S. 46.

[2]) Fisheries, Ireland, Sci. Invest., 1905, II, [1906], S. 16.

[3]) Jeg har faaet det fra den danske Generalkonsul i Algier, Dr. Nissen, ved min Ven Dr. Johs. Schmidts Mellemkomst. For denne Tjeneste beder jeg de to Herrer herved modtage min bedste Tak.

og ved Hjælp af et Par Beskrivelser, som er baserede paa Undersøgelsen af nogle faa Eksemplarer. Jeg er nu af den Mening, at Fisken maa opstilles som en selvstændig Art, som af de hidtil kendte Arter af denne Slægt nærmest slutter sig til *Ph. mediterraneus.*

Dette Eksemplar er en udvokset, 836 mm. lang Hun med kun lidt udviklede Ovarier. Om Føden fik jeg ingen Oplysninger, da Mavesækken var krænget ud af Munden.

Beskrivelse:

Legemsformen er temmelig undersætsig, idet Legemets største Højde, som findes ved Begyndelsen af 2. Rygfinne, og er lidt mindre end Hovedets Længde, gaar omtrent $4^2/_3$ Gange op i Totallængden, som er 836 mm. Den største Tykkelse, 110 mm., findes under 1. Rygfinne, i Højde med Gællelaagets Hjørne og udgør omtrent $^2/_3$ af Legemshøjden. Legemets Tværsnit bliver saaledes ægdannet. Halen smalner hurtig af og har ved Slutningen af Gatfinnen kun en Højde af 32 mm. Gattet er beliggende midt imellem Snudespidsen og Halefinnens Rod.

Hovedet er pyramideformet, idet Snude og Pande er flade ovenpaa, og Issen paa begge Sider begrænses af en lav Forhøjning, der løber fra Øjebrynet hen til Gællelaagets øverste Del. Hovedets Længde er 190 mm., eller lidt større end Legemets største Højde, og gaar næsten $4^1/_2$ Gang op i Totallængden. Snuden er bred og temmelig kort, knap $1^1/_2$ Gang saa lang som Øjehulens horizontale Diameter. Overkæben rager c. 10 mm. frem over Underkæben. Denne er forsynet med en ganske lille (rudimentær), knap nok 4 m. lang Føletraad. — Øjnene er af Middelstørrelse og sidder saa højt oppe, at de nærmer sig stærkt til Profillinien. Øjehulens horizontale Diameter er betydelig mindre end Snudens Længde og gaar omtrent 3 Gange op i Hovedets postorbitale Del ($5^1/_2$ Gang op i Hovedets Længde). — Det bageste af Næseborene sidder i 9 mm.'s Afstand fra Øjehulens Rand og er 4 mm. langt; det forreste er kun halv saa stort og i 8 mm.'s Afstand fra det andet. —

Munden er af Middelstørrelse, lidt opstigende og rækker hen under Orbitas forreste Rand, medens Overkæbebenet naar lidt forbi dennes Midte. Tænder findes kun paa Kæberandene og paa Plovbenet. De er alle ganske smaa, idet de længste kun er 2 mm. høje, og spidse og danner meget tætte „Karter“.

Gællelaagets bageste Hjørne danner en næsten ret Vinkel. 1. Gællebues Udvækster er korte og tykke og 12 + 2 i Antal. De andre Gællebuer bærer henholdsvis 11 + 2, 10 + 2 og 10 + 1 knudeformede Udvækster. Gællehuden er vokset sammen med Isthmen. Gællehudstraalerne er 7.

1. Rygfinne begynder c. 30 mm. bagved Hovedet. Den er kort og forholdsvis lav, kun lidt højere end 2. Rygfinne, og har 10 Straaler. Dens 3. Straale, som er 75 mm. lang, er lidt forlænget, thi den rager c. 20 mm. op over sine nærmeste Naboer. — 2. Rygfinne er meget lang og ved omtrent lige store Mellemrum skilt fra 1. Rygfinne og Halefinnen. Den har 55 Straaler og er højest bagtil, hvor dens Straaler naar en Længde af 60 mm., medens de fleste af dem er omtrent 55 mm. lange.

Gatfinnen begynder lige bagved Gattet og strækker sig ligesaa langt tilbage som 2. Rygfinne. Den er lidt lavere end denne, idet de fleste af dens 49 Straaler er 35—42 mm. (højest fortil). Begge disse Finner er beklædte med en temmelig løs, skælbeklædt Hud.

Halefinnen er temmelig smal, med afrundede Hjørner; dens længste (midterste) Straaler er 75 mm. lange. Den har, saa vidt jeg kan se, 5 + 19 + 5 = 29 Straaler.

Brystfinnerne er fæstede under (lidt foran) Gællelaagets Hjørne og næsten trekantede af Form. De har 16 Straaler, hvoraf 3.—6. øverste er de længste; nogle af de yderste er enkelte, alle andre tokløvede.

Bugfinnerne er fæstede langt foran Brystfinnerne og bestaar af de hos Slægten sædvanlige 3 Straaler, men de er forholdsvis kortere end hos nogen anden *Phycis*-Art, thi de rækker

ikke saa langt tilbage som Brystfinnerne. De er dybt kløvede, og den øverste Straale er c. 1/4 Del kortere end den længste.

Sidelinien begynder lige ved Hovedskallen, slaar en Bugt højt op paa Siden, nærmer sig først omtrent midt paa Halen Legemets Midtlinie og bliver utydelig kort foran Halespidsen. Den er lidt lysere af Farve end dens Omgivelser.

Skællene er forholdsvis smaa, ctenoide, med nogle stumpe Takker paa Bagranden; de har en Mængde koncentriske Bølgelinier og 5—6 utydelige Vinterringe. De er elliptiske af Form, de største 10,5 mm. lange og 8 mm. brede; langs Sidelinien er der c. 160 Skæl, og 11 Rækker mellem 1. Rygfinne og Sidelinien. — Skælbeklædningen strækker sig helt ud til Snuden og ud paa de uparrede Finner, saaledes, at forreste Del af 1. Rygf. er skælbeklædt, medens kun yderste Fjerdedel af 2. Rygfinne, Halvdelen af Gatfinnen og en Tredjedel af Halefinnen, samt Underkæben og de parrede Finner er fri.

Farven ligner meget den hos *P. blennioides*, ɔ: overalt graarødbrun, undtagen paa Bugen, Bugfinnerne, Kæberne, Hovedets Underside og Gællehuden, hvor den er lysegulgraa. 2. Rygf. og Gatfinnen er kantede med sort. Mundhulen er hvid fortil, blaaviolet bagtil, Gællehulen forholder sig omvendt; Bughinden er hvid.

Udmaalinger (til Sammenligning sættes (i 2. Kolonne) tilsvarende Maal af det føromtalte Eksemplar af *P. mediterraneus* fra Middelhavet):

Totallængde	836 mm.	225 mm.
Hovedets Længde	190 —	49 —
Afstanden fra Snudespids til Gat	400 —	92 —
Snudens Længde til Øjet	55 —	11 —
Legemets største Højde	180 —	49 —
— Højde ved Hovedet	165 —	39 —
— — — Gattet	160 —	41 —
— — — Midten af Gatfinnen	110 —	31 —
Halens mindste Højde	32 —	9 —

Hovedets Postorbitaldel	110 mm.	23 mm.
Legemets største Tykkelse	90 —	25 —
Øjets horizontale Diameter	35 —	14 —
— lodrette —	31 —	9 —
Pandebenets Bredde mellem Øjnene	45 —	8 —
Afstanden fra Snudespids til 1. Rygfinne .	230 —	55 —
— - — - Brystfinnen ..	200 —	52 —
— - — - Gatfinnen ...	415 —	95 —
— - Underkæbespidsen til Bugf. .	130 —	40 —
1. Rygfinnes Længde	60 —	16 —
2. — —	400 —	112 —
Gatfinnens —	305 —	100 —
Brystfinnens —	130 —	31 —
Bugfinnens —	192 —	92 —
Halefinnens —	75 —	26 —

Diagnose: Forma robustior. Altitudo corporis tres quartæ decimæ partes, longitudo capitis duæ fere nonæ partes longitudinis totius. Diametrus horizontalis oculi duæ tertia partes rostri, et duæ undecimæ partes capitis totius. Latitudo minima ossis frontalis diametrum verticalem oculi superat. Anus in medio corpore (pinna caudali exclusa) situs. Barba minima, septima modo pars diametri horizontalis oculi. Pinnæ ventrales breves, nec ad apicem pinnarum pectoralium attinent. Pinna prima dorsalis secunda vix altior, radius tertius tamen paululum elongatus. — Dentes minores, admodum in intermaxillari et maxilla siti. — Squamulæ minores, series c. 12 inter lineam lateralem et pinnam dorsalem primam formantes et c. 160 in linea laterali sitæ. — Maxima pars corporis unicolor, rubro-griseofuscus, caput infra, venter, pinnæque ventrales flavo-albidæ, margo p. dorsalis secundæ et p. analis atroviolaceus.

Formula radiorum: D^1. 10, D^2. 55, A. 49, C. 29, P. 16, V. 3.

Unum modo adhuc exemplar notum, femina adulta, ad oram occidentalem Islandiæ, in sinu Faxaflói (Jökuldjúp) repertum.

Naar man sammenligner ovenstaaende Beskrivelse og Maal med Günthers[1]) og Moreau's[2]) Beskrivelser af *Phycis mediterraneus*, saa viser Forskellen sig først og fremmest i det lave Straaleantal i Finnerne hos min Art, idet dette hos *P. mediterraneus*, ifølge Moreau er følgende: D.¹ 9—11, D.² 57—65, A. 55—60, C. 27—29, P. 17—18, V. 1 (2—3); desuden er Øjnene hos min Art mindre (betydelig mindre end Pandebenets Bredde mellem Øjnene), Hagetraaden og Bugfinnerne meget kortere, Gatfinnen kortere, Gattet længere tilbage, under 10. Straale i 2. Rygfinne (under 5. hos *P. m.*) og 1. Rygfinne omtrent ligesaa lang som høj (naar der ses bort fra den forlængede Straale). Skællenes Antal langs Sidelinien er betydelig større hos min Art (c. 160 imod c. 130), ɔ: Skællene mindre. Endelig er Farven tildels forskellig, f. Eks. paa Bugfinner og i Mundhulen. — M. H. t. Straaleantal i Ryg- og Gatfinne stemmer den nogenlunde overens med *Phycis Aldrichii* Brown[3]), men afviger ellers i flere Forhold fra denne, forøvrigt lidet kendte, nordatlantiske Art.

Jeg synes af det ovenfor anførte, at der er god Grund til at opstille dette islandske Eksemplar som en selvstændig Art. Men det er dog ikke usandsynligt, at den med Tiden vil vise sig at være en nordisk Varietet af *Ph. mediterraneus*, og at Kløften imellem dem vil udfyldes af Overgangsformer, som maaske har hjemme paa dybere Vand langs Vestevropas Kyster.

6. *Hippoglossus hippoglossoides* (Walb.). Hellefisken.

Jeg har i min Oversigt, S. 72, gjort Rede for denne Fisks Forekomst ved Island, og ifølge den Redegørelse maa den nærmest betegnes som ret sjælden paa lavere Vand (indenfor 200 Fv.-Kurven). Men siden har jeg faaet Oplysninger om den, som viser, at den, i det mindste til Tider og paa visse Steder, slet ikke er

[1]) Catalogue of the Fishes in the British Museum, Vol. IV, 1862, S. 354—355.
[2]) Histoire Naturelle des Poissons de la France III, 1881, S. 266—267.
[3]) Journal of Marine Biol. Association, Vol. I, 1889—90, S. 310—311.

saa sjælden, som man før maatte antage. Dette gælder særlig den dybe Rende (Eyjafjarðaráll), som fra Ishavet skyder sig ind i Eyjafjords Munding. Her har Motorbaadfiskere fra Eyjafjord fanget den paa Line paa 100—200 Fv. Dybde, i senere Aar, især i 1909, da mange Baade plejede at faa 10—30 Stykker paa hver Tur om Sommeren, enkelte endogsaa 50[1]). De har gennemgaaende været temmelig smaa, 60—80 cm. lange. — Disse Oplysninger skylder jeg Hr. Johannes Davidsson, en intelligent ældre Fisker paa Hrisey i Eyjafjord. Det er ikke usandsynligt, at Hellefisken ogsaa kunde være ret hyppig paa lignende Dybder i de forskellige „Dyb", som skyder sig ind imod Kysten mellem Flakkene langs Islands Nordøst- og Østkyst, hvor Vandet ogsaa altid har Temperaturer, som ligger omkring 0°.

7. *Plagiodus ferox* (Lowe).

I min Oversigt over Islands Fiske har jeg, S. 100—101, givet Oplysninger om, hvad man indtil da havde fundet af denne Fisk ved Island. Siden er der kommet flere, og enkelte ret interessante, Tilfælde, hvor den er fundet opskyllet eller endogsaa fanget.

Det første af disse Tilfælde falder i Aaret 1906, da et Eksemplar strandede (levende) i den lille Bugt Kollsvik SV. for Patriksfjord, men blev ødelagt, uden at jeg kunde faa fat i noget synligt Bevis, da Oplysningen om dette (givet mig af et Øjenvidne) først naaede til mig i 1910. — I Midten af April 1909 blev et c. 1 Meter langt, men stærkt beskadiget Eksemplar skyllet op i Sugandafjord, næste Fjord SV. for Isafjords Dyb; nogle Rester af det blev bragt til Hr. cand. theol. L. Thorarensen, den Gang Lærer i Isafjord, som senere forærede den ene Halvdel af Underkæben til vor Samling og lod den Oplysning følge med, at der antagelig var strandet endnu et Eksemplar af denne Fisk i samme Fjord, et Par Aar i Forvejen.

---

[1]) Se ogsaa Forfatteren: Fiskirannsóknir 1909—1910. Andvari XXXVI. S. 99.

Et ganske interessant Tilfælde forefaldt tidlig i Juni Maaned 1909 paa Dyrafjord Banke, udfor NV. Kysten: En Fiskekutter fra Reykjavik fiskede dér, paa 60—70 Fv. Vand. Pludselig viste der sig paa Siden af Kutteren en Sværm af usædvanlige og Besætningen ganske ubekendte Fiske. Det lykkedes ved Hjælp af en Hage at faa fat i en af dem og bringe den op paa Dækket, hvor den slog saa vældig om sig og viste et saa frygteligt Gebis, at Mandskabet blev helt imponeret. De andre Fiske, hvis Antal man anslog til 20—30 Stykker, blev skræmmet og satte Kursen i Retningen af Land. Man kunde ikke se, at de var paa Jagt efter nogetsomhelst Bytte. Den fangede Fisk blev slaaet ihjel og senere bragt til Reykjavik, men i en meget uheldig Tilstand (flækket, saltet og tørret). Jeg fik kun tilfældigvis at vide om Fiskens Ankomst og fik den reddet for Samlingen, men i en endnu værre Tilstand (Hovedet traadt i Stykker, alle de større Finnestraaler knækkede o. s. v.). Fisken var den her omtalte Art og maalte c. 160 cm.

Det sidste Tilfælde forefaldt i Isafjords Dyb. Forhenværende Distriktslæge Thorv. Jónsson sendte mig ifjor et Eksemplar fra Fiskerlejet Bolungavik, hvor det blev fundet opskyllet d. 11. Mai 1911. Fisken var c. 150 cm. lang, men stærkt beskadiget, da den ankom til Samlingen. Den ene Halvdel af Hovedet var borte, alle de længere Finnestraaler knækkede m. m., og selve Fisken hærdet i Formalin, krummet og forvredet. I Maven var der en halvfordøjet, c. 42 cm. lang Brosme.

De i mit citerede Arbejde omtalte Fund tydede paa, at denne Fisk ved Island særlig skulde høre hjemme udfor Nordvestkysten. Alle de her omtalte Fund tyder ogsaa paa det samme; de stammer jo alle fra Nordvestkysten [1]).

Jeg kunde med Nød og næppe tælle Finnestraalerne hos de to sidstfundne Eksemplarer. — Straaleantallet var følgende:

---

[1]) Siden dette blev nedskrevet, har jeg pr. Telefon faaet Meddelelse om endnu et Tilfælde fra Isafjords Dyb. Dette Eksemplar haaber jeg at faa i nogenlunde komplet Tilstand.

Dyrafjord-Eksempl. D. 41, A. 15—16, C. 7 + 18 + 6, P. 15, V. 10.?
Bolungavik-Ekspl. D. 42, A. 15, C. 7 + 18 + 7, P. 14, V. 9.

Disse Tal stemmer ganske overens med tilsvarende Tal hos Goode & Bean[1]).

8. *Petromyzon marinus* L. Havlampretten.

I min Oversigt har jeg, S. 127, givet Oplysninger om denne Fisks Forekomst ved Island til Aaret 1908 og betegnet den som en sjælden Fisk dér. Men siden har den vist sig saa talrig, at denne Betegnelse næppe er korrekt længer. I Aaret 1909 har den nemlig indfundet sig i en usædvanlig stor Mængde ved Østkysten og Vestmannøerne, som oftest fastsuget til Fiskerbaadene. — Ved Østkysten viste den sig om Sommeren, især i August. Saaledes fandt man et c. 1 Alen langt Eksemplar „siddende" paa en islandsk Baad udfor Seydisfjord, og et andet sad paa en færøisk Baad, da denne landede paa Brimnes inde i samme Fjord. To blev fundet fastsugede til Baade inde i Nordfjord og én hængende paa en Blære (Linebøje) udfor samme Fjord. Alle disse Tilfælde (hvorom jeg har faaet Oplysninger hos Øjenvidner) falder sent i August. En af Fiskene selv har jeg faaet tilsendt. De fleste af dem blev først opdaget, da man landede efter en Fisketur ud paa Havet, og det samme gælder ogsaa om to Ekspl., som blev indsendt til Samlingen, det ene fra Eskifjord, det andet fra Stödvarfjord. Tidspunktet, paa hvilket den blev fundet, blev ikke angivet, men det faldt vistnok omtrent samtidig med de andre.

Efter dette at dømme lader det til, at der har været en betydelig Mængde Havlampretter udfor den sydlige Del af Østkysten, i den sidste Halvdel af August, siden den sugede sig saa hyppig fast paa flere af de Baade, som fiskede hist og her udenfor Kysten paa omtalte Strækning.

I Februar samme Aar fik jeg et Eksemplar af denne Fisk fra Vestmannøerne, hvor det blev fundet hængende paa en Motorbaad.

[1]) Oceanic Ichthyology, 1895, S. 117.

Den 22. og 23. Nov. samme Aar viste den sig saa talrig der ved Øerne, at „den sugede sig fast paa de fleste af de 20 Baade, som gik paa Fiskeri i de Dage; paa nogle af dem fandtes der 2—3 Stykker, ja 5 paa en enkelt Baad“, skriver min Korrespondent der paa Øen. Det lader altsaa til, at der denne Gang har været en større Stime til Stede.

Næste Aar, 1910, viste den sig igen, dog ikke saa talrig som før. Saaledes saa man, tidlig i August, i Grindavik to Eksemplarer siddende paa Fiskerbaade, det ene inde ved et Landingssted, det andet c. 1 Kvml. tilsøs. (Meddelelsen givet af en Iagttager). — Den 23. Sept. blev et fuldvoksent Eksemplar fundet paa en Fiskekutter i Eyjafjord, og omtrent samtidig blev et andet fundet i Olafsfjord (en lille Bifjord til Eyjafjord) og sendt til Samlingen. Senere er den ikke, saavidt jeg véd, blevet iagttaget ved Island.

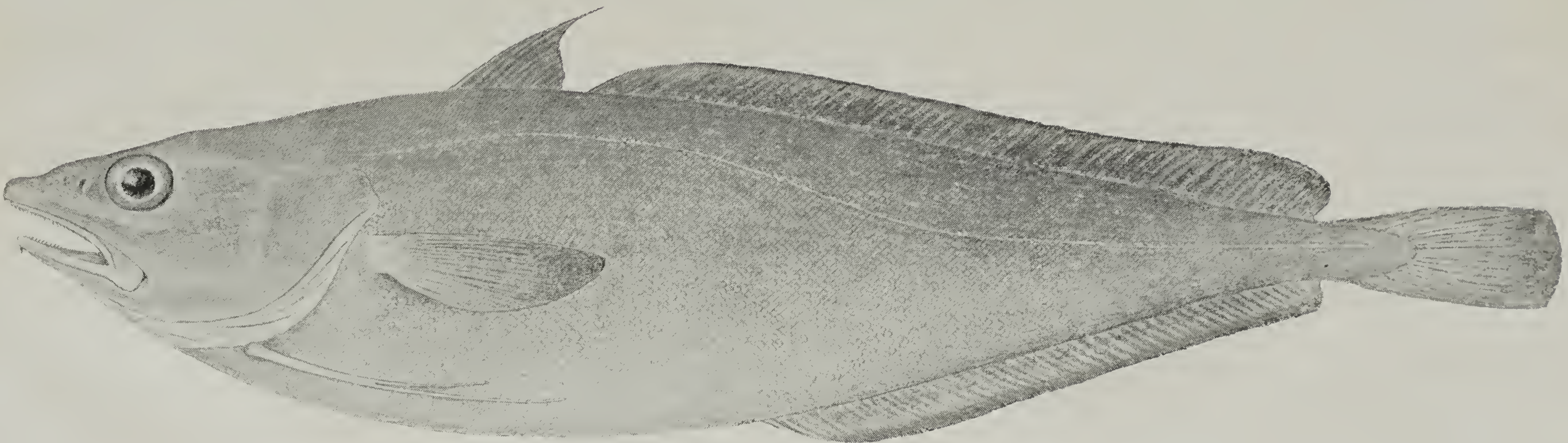
Længden af de Eksemplarer, som jeg har haft Lejlighed til at undersøge, har været 54 til 86 cm., altsaa nogenlunde udvoksne Individer, men, som det var at vente, med uudviklede Generationsorganer. Ingen Steder har jeg hørt om, at den skulde være fundet i Brak- eller Ferskvand.

Ifølge Temperaturangivelserne i Nautisk-Meteorologisk Aarbog[1]), har Temperaturen (i Overfladen) i Havet Ø. for Island været usædvanlig høj i 1909, særlig i Foraarsmaanederne (Marts—Mai). Dette kunde maaske være en medvirkende Aarsag til Havlampretteus Masseoptræden — hvis man tør bruge dette Udtryk — ved Island i 1909, særlig ved Østkysten, hvor man først iagttog den. Senere er den maaske vandret til Sydkysten, for saa maaske i Løbet af næste Vinter og Sommer at fortsætte Vandringen til Vest- og Nordkysten.

---

1) Nautisk-Meteorologisk Aarbog for 1909, København 1910.

Tab. II.



B. Sæmundsson del.

Phycis borealis n. sp. ♀.

Typ. Bianco Luno.

XIII.

Meddelelser om Fugle, ny eller sjældne for Island.

I Videnskabelige Meddelelser for 1905 gav jeg nogle Meddelelser om Fugle, som enten var ny eller sjældne for Islands Fauna. Siden er der kommet nogle „ny“ Fugle til, ligesom jeg har faaet enkelte sjældne Fugle at se, enten indsendte til den naturhistoriske Samling i Reykjavik, eller hos den Mand, som præparerer Fugleskind for denne. Desuden har jeg til Stadighed haft min Opmærksomhed henvendt paa sjældne Fugle, som har vist sig i Nærheden af Byen (Reykjavik), samt indhentet Oplysninger hos Folk, som jeg anser for nogenlunde paalidelige Iagttagere. — Disse, ganske vist ikke særlig omfangsrige, Oplysninger syntes jeg, at jeg ikke burde lade vente længere med at publicere, da en Del af dem allerede er blevet syv Aar gamle; men det skal tillige bemærkes, at jeg allerede har givet korte Beretninger om flere af de her omtalte Fugle, i den islandske Naturh. Forenings Aarsberetninger[1]).

Jeg omtaler Fuglene i samme Rækkefølge som i mine ældre Meddelelser og giver Oplysninger om de enkelte Fugle i kronologisk Orden.

1. *Turdus merula* L. Solsort.

Af denne Fugl saa jeg to Hanner i Reykjavik 20.—25. November 1907, og d. 1. December s. A. saa jeg en Hun sammesteds. — Skindet af en Hun, som blev skudt ved Akureyri i Januar 1909, blev indsendt til Samlingen. — D. 8. Dec. 1911 blev der skudt en Han nær ved Reykjavik.

Disse Eksemplarer har jeg set personlig, men desuden har jeg faaet en, vistnok paalidelig, Oplysning om en Han, som blev iagttaget i Grindavik d. 6. Januar 1908. Mindre sikre Oplysninger har jeg faaet om, at den skulde have vist sig i forskellige Egne paa Øst- og Sydlandet midt om Vinteren 1909, saaledes i Borgar-

[1]) Skýrsla hins íslenzka náttúrufræðisfélags 1905—1910.

fjord (Østlandet), Lón (Sydøstkysten). samt i Landeyjar og Flói paa Sydlandet. — En af mine flinkeste Elever saa 4—5 Stykker under et Ferieophold i Flói ved Juletid 1911, og endelig fortælles det, at samtidig og lidt senere skulde flere Fugle af denne Art have opholdt sig omkring Stokkseyri og Eyrarbakki[1]), altsaa i Nærheden af sidstnævnte Sted. — Det lader saaledes til, at Solsorten maa regnes blandt de hyppigere Vintergæster paa Island.

2. *Turdus pilaris* L. Sjagger.

Den 8. Dec. 1905 saa jeg en Sjagger i min Have i Reykjavik, hvor den opholdt sig i 3—4 Dage, for at spise de den Gang endnu hængende Rønnebær. — Den 14. Jan. 1908 saa jeg igen én paa dette Sted, men den forsvandt hurtig igen. — Samme Aar, d. 27 Dec., drev en Han i Land under en Storm af SØ., i Mundingen af Berufjord paa Østkysten. Den blev foræret til Samlingen som Mumie. — Faktor P. Nielsen, Eyrarbakki, skænkede Samlingen en Han, som blev nedlagt der i Nærheden d. 6. Jan. 1909. — Endelig blev der skudt en Han nær ved Reykjavik d. 7. Febr. 1911, og nogle Dage i Forvejen havde jeg set en Sjagger (den samme?) flyve over Byen. — Disse Fund tyder paa, at denne Fugl er ikke saa særlig sjælden Vintergæst paa Island.

3. *Sylvia hortensis*? (Gm.) Havesanger.

Den 18. Okt. 1911 opdagede jeg en lille Fugl af en Stenpikkers Størrelse i min Have, hvor den hoppede smaakvidrende om i en Ribsbusk, kun i en 6—8 Meters Afstand fra Forstuedøren. Jeg hentede en god Teaterkikkert og kunde iagttage den i et Par Minutter, som om den kun var i et Par Meters Afstand. Saa fløj den hen til et Rønnetræ og derfra uden Ophold til nogle Hindbærstængler, hvor den opholdt sig et Minut eller saa, hvorpaa den fløj bort, for ikke at vise sig mere. Jeg sammenlignede derpaa Fuglen med de Afbildninger og Beskrivelser, jeg havde hos mig, og syntes, at den nærmest saa ud til at være *Sylvia hortensis*. Men

[1]) Suðurland 1912, Nr. 44 og en Iagttager.

hvad enten det nu har været denne, eller en anden *Sylvia*-Art, saa har jeg dog haft for mig en Fugl, som er ny for Islands Fauna, thi hidtil er ingen Fugl af *Sylvia*-Slægten blevet iagttaget paa Island.

Senere fik jeg at vide, at Hr. Sagfører H. Thorsteinson i sin Have, som er beliggende midt i Byen, i Efteraaret fra Tid til anden havde set en Fugl, som efter Beskrivelsen at dømme rimeligvis har været samme Fugl.

4. *Motacilla flava* L. Gul Vipstjert.

Denne Fugl, som er ny for Islands Fauna, blev, ifølge Hr. Skolebestyrer St. Stefánsson's Meddelelse[1]), fanget i Akureyri, hvor den fløj ind i en Butik d. 8. Nov. 1910. Den blev sat i Bur, men døde efter et Par Dage. Den findes opstillet i Realskolens Samling, men hvorvidt den tilhører den typiske Form, eller Varieteten *borealis*, skal jeg ikke sige.

5. *Troglodytes borealis* (Fisch.) Gærdesmutte.

Denne (i mit før omtalte Arbejde under Navnet *Tr. parvulus* Koch omtalte) Fugl, som just ikke hører til de tilfældige Gæster, da den er en Standfugl paa Island, har, saavidt jeg ved, kun vist vist sig et Par Gange i Reykjavik i de senere Aar, nemlig den 6. November 1905, da jeg saa én flyvende nede ved Stranden, ligeledes lidt senere i samme Maaned, da én, maaske det samme Individ, blev taget af en Kat, og saa i Vinter (1912); da blev en Hun fanget den 24. Februar; den er nu opstillet i Samlingen.

6. *Loxia curvirostra* L. Alm. Korsnæb.

Af denne Fugl, som er ny for vor Fauna, modtog Samlingen et Eksemplar, som blev skudt i Nærheden af Keflavik ved Faksebugten, d. 2. Juli 1909, tilligemed et andet Eksemplar, som tilfaldt Realskolen i Akureyri. Omtrent samtidig fandt man et dødt

---

[1]) Skýrsla um gagnfræðaskólann á Akureyri, 1910—11, S. 37.

og temmelig ilde tilredt Eksemplar paa Heimaey (Vestmannøerne), hvilket ogsaa tilfaldt vor Samling.

Alle disse tre Fugle var Hunner; to af dem, Vestmannø-Eksemplaret og det ene af Keflavik-Eksemplarerne, har jeg undersøgt nærmere, og de viser sig at tilhøre den typiske Form af Arten, hvad der vil fremgaa af følgende Maal.

	Keflavik-Eksplr.	Vestmannø-Eksplr.
Totallængde	170 mm.	165 mm.
Vingelængde	95 —	95 —
Næbbets Længde	18 —	18 —
— Højde	11 —	12 —
Mellemfod	21 —	22 —
Mellemtaa [1])	16 —	16 —

Senere fik jeg at vide (af en Mand fra Nordfjord, der besøgte Samlingen og dér fik Keflavik-Eksemplaret at se opstillet), at endnu en Korsnæb skulde have vist sig paa Østkysten i Juni Maaned, det samme Aar. Denne Fugl havde sat sig paa en Motorbaad langt ude tilsøs udfor Nordfjord. Den blev fanget og bragt i Land, hvor den blev sat i Bur. Den viste sig saa tam, at den spiste Brød af sin Herres Haand. Det gik godt med Fuglen i 4 Dage, men den 5. Dags Morgen fandt man den død i Vinduet; man havde glemt at lukke Buret Aftenen i Forvejen; den har da villet benytte Lejligheden til at komme bort, er styrtet hen til det, efter dens Opfattelse, aabne Vindue, men er stødt imod Ruden og har saaledes slaaet sig ihjel. — Min Hjemmelsmand erklærede, at Nordfjord-Eksemplaret havde været af ganske samme Udseende som Keflavik-Eksemplaret; det har vel altsaa ogsaa været en Hun, og antagelig tilhørt samme Art.

Denne omtrent samtidige Optræden af denne Fugl paa tre forskellige og vidt adskilte Steder lader sig forklare saaledes, at en

---

[1]) Dette og følgende Maal er regnet til Kloens Udspring.

lille Flok har forvildet sig eller er blevet forslaaet over til Island, hvor den saa er blevet splittet ad.

Dette er første Gang, at en Korsnæb med Sikkerhed er blevet iagttaget paa Island, thi at der, for 12—14 Aar siden, skulde have været en Korsnæb i Bygden Ølfus paa Sydlandet, hvad en Beskrivelse, som en af mine Elever den Gang gav mig af en Fugl, som han havde set, nærmest kunde tyde paa, tør slet ikke betragtes som sikkert.

7. *Ampelis garrula* L. Silkehale.

Jeg omtalte i min forrige Meddelelse denne Fugl som ny for Landets Fauna. Nu kan jeg føje et Tilfælde til: Den 28. Nov. 1910 blev et Eksemplar fanget levende i Reykjavik. Fuglen blev sat i Bur, men det havde sin Vanskelighed at skaffe den Føde. Først blev den fordret med Rønnebær, men da disse var sluppet op, vilde den hovedsagelig kun have Rosiner og senere hen kun Sukker og Fløde. Den 22. Febr. skete det Uheld, et en Kat væltede Buret med Fuglen i ned af et Bord; den blev derved saa forskrækket, at den ikke vilde æde, og døde Dagen efter. Nu staar den opstillet i Samlingen.

Jeg fik Lejlighed til at undersøge denne Fugl, da den blev fanget. Jeg kunde ikke se noget Mærke paa den af, at den skulde have været i Bur før. Fødder og Fjer saa ganske rene ud. Under Fangenskabet viste den sig meget tam og munter og kvidrede hyppigt.

Omtrent samtidig med at denne Fugl blev fanget, saa man et Eksemplar (det samme?) i Akureyri (Skolebestyrer St. Stefánsson).

8. *Hirundo rustica* L. Forstuesvale.

Hantzsch har[1]) givet en ret udførlig Beretning om Forstuesvalens Forekomst paa Island, hvor han betegner den som en „gelegentlichen Sommergast", og han overdriver sikkert ikke, idetmindste vil jeg antage, at den, naar Talen er om Sydvestkysten

[1]) Beitrag zur Kenntnis der Vogelwelt Islands 1905, S. 312—313.

alene, viser sig de fleste Aar og i enkelte Aar endogsaa ikke saa ganske faatallig. Jeg har optegnet alle de Tilfælde, hvor jeg har set den eller faaet sikrere Oplysninger om dens Forekomst i de sidste ti Aar, men de fleste Tilfælde stammer fra Hovedstaden og dens nærmeste Omgivelser.

Nu afdøde Læge Th. Jónsson indsendte i 1904 et stort, beskadiget Eksemplar fra Vestmannøerne, hvor det blev fundet c. den 20. Mai, samme Aar; samtidig saa man der nogle levende. — Den 12. Juni samme Aar saa jeg én i Reykjavik; den og to andre var nu og da blevet iagttaget i og omkring Byen i de tre foregaaende Uger. — Den 16. Mai 1905 var der to Fugle i Byen; de opholdt sig der i et Par Dage. I 1908 var der igen to, men de havde vistnok kun et kort Ophold, thi jeg saa dem kun en enkelt Gang, nemlig d. 29. Mai. — Endelig var der en lille Flok i Juni 1911. Den ankom under en stærk og varm Storm af SØ. Jeg saa 4 d. 2. Juni og næste Dag 5 eller flere; af andre blev der talt 8 eller endogsaa 10 Stykker. Den 4. Juni var de imidlertid allerede borte og viste sig ikke mere, men tidlig i Juni blev to set nær ved Isafjord; den ene af dem blev skudt, men ødelagt. Jeg traf Skytten senere; han fremhævede, at Svalen havde haft rød Strube. — Jeg skal tilslut føje til, at det fortælles, at et Par Svaler skal have ynglet paa Gaarden Gaulverjabær paa Sydlandet forleden Sommer (1911). Antagelig har det da været denne Art, som forøvrigt vistnok besøger Sydkysten ret hyppig (de fleste Aar). Jeg husker fra jeg var Dreng, at der var jævnlig Svaler om Foraaret i Grindavik; men hvorvidt det udelukkende var Forstuesvalen, tør jeg naturligvis ikke sige noget om. Bysvalen (*Chel. urbica*) har jeg aldrig iagttaget med Sikkerhed paa Island.

9. *Sturnus vulgaris* L. Stær.

I Tilslutning til hvad jeg meddelte i min før citerede Afhandling, kan jeg her bemærke, at to Stære blev skudt nær ved Reykjavik d. 13. Nov. 1906 og forærede til Samlingen. En blev fundet drevet i Land i Berufjord (sammen med den før omtalte

Sjagger) og indsendt som Mumie til Samlingen. — To blev endvidere skudt ved Reykjavik d. 9. Febr. 1911 (saa dem begge). — En Flok Stære skal have været omkring Stokkseyri paa Sydkysten i Januar og Februar i Vinter (1912). Man saa dem snart 4, snart 8 sammen[1]). Endelig fortælles det, at der skulde have været Stære flere Steder paa Østkysten, især Syd for Gerpir, i Dec. 1908 og Jan. 1909 (Vejret var den Gang særlig varmt paa Island), men en Forveksling med Solsorthanner kunde dog muligvis foreligge.

10. *Corvus frugilegus* L. Raage.

Selv har jeg ikke set meget til Raagen i senere Aar, dog iagttog jeg et enkelt Individ i Reykjavik d. 28. Nov. 1909, og lidt senere blev to set flyvende ved Byen. I 1906 iagttog Hr. Tandlæge V. Bernhöft en mindre Flok i Byens Omegn midt i Januar.

11. *Corvus monedula* L. Allike.

Af denne, paa Island meget sjældne, Fugl har Samlingen i senere Aar kun faaet et Eksemplar, som blev skudt nær ved Reykjavik den 26. Okt. 1910. Det var en 335 mm. lang Hun, med 233 mm. Vingelængde.

12. *Columba palumbus* L. Ringdue.

Hantzsch meddelte (Op. cit. S. 276) at en Ringdue, ifølge et Brev til ham fra Faktor P. Nielsen, blev nedlagt i Omegnen af Eyrarbakki i Slutningen af Dec. 1911. Det er det første Tilfælde, hvor denne Fugl er set paa Island. I 1905 modtog Samlingen Skindet af en Ringdue som Gave fra Rev. H. H. Slater (Forfatteren af Manual of the Birds of Iceland). Han havde faaet Fuglen fra Mývatn, hvor den blev fundet i 1905. Jeg har intet set publiceret om dette Fund fra Slaters Haand, men har selv givet en kort Meddelelse om det før[2]).

---

[1]) Suðurland 1912, Nr. 44.
[2]) Skýrsla hins ísl. náttúrufræðisfélags, 1905—07, S. 25.

13. *Turtur vulgaris* Eyt. Turteldue.

Denne Fugl, som er ny for Islands Fauna, blev skudt paa Heimaey (Vestmannøerne) d. 12. Oktober 1911 og iagttaget et Par Dage i Forvejen. Muligvis er dette en Fugl, som er sluppet ud af et Bur (Turtelduen holdes, omend sjældent, i Bur paa Island), men Fjerene var fuldstændig rene og uden Mærker efter Ophold i Bur. Kun Fødderne var lidt skrammede, men om de var det førend Fuglen blev nedlagt, vides ikke.

Eksemplaret var en ung Han, 285 mm. lang, Vingen 166 mm., Mellemfoden 25 mm. og Mellemtaaen 27 mm. Disse Maal, saavel som Fuglens Farve, tyder paa, at den maa henføres til Artens typiske Form.

14. *Cuculus canorus* L. Gøg.

Lige til den sidste Tid har „Klatrefuglene" glimret ved deres Fraværelse, naar Talen har været om Island. Men i Juni 1911 overraskede Provst A. Jónsson paa Skútustaðir mig med at indsende en Gøg til Samlingen. Den blev fundet død i Laxárdalen i Nærheden af Mývatn, en Gang i Aaret 1904, men i en meget daarlig Forfatning, antagelig sønderrevet af en Falk: Brystmuskler og Indvolde var væk, men Hoved, Vinger, Hals og Fødder uskadte, og Fuglen derfor let kendelig. Dette er det første, men ikke det eneste Eksempel paa Gøgens Forekomst paa Island, thi Hr. Conservator Henry Larsen omtaler i en lille Afhandling om Fuglelivet paa Island[1]), en Gøg, som han iagttog paa en Rejse fra Geysir til Reykjavik i Slutningen af August 1910. Hr. Larsen er saaledes den første, der omtaler Gøgen som forekommende paa Island.

15. *Otus brachyotus* (Forster) Mose-Hornugle.

Af denne, paa Island ellers temmelig sjældne, Fugl har jeg set ikke saa faa i den sidste Tid. Den 18. Okt. 1908 blev én skudt paa Vatnleysustrønd, paa Nordsiden af Reykjaneshalvøen, hvor den forfulgte en Flok Ryper. — En anden blev skudt paa

---

[1]) Smaatræk af Fuglelivet fra en Rejse til Island. Dansk Ornit. Foren. Tidskr. V. S. 212.

Vestmannøerne, den 25. Okt. 1909 og en tredje i Nærheden af Gaarden Skógarkot ved Thingvallasøen, c. den 8. Marts 1910. — Endelig blev én nedlagt af Læge Jón Bløndal ved Gaarden Stafholtsey i Mýrasyssel, c. den 25. Sept. 1910. — Alle disse Eksemplarer har jeg set selv. Totallængde og Vingelængde af de tre første var henholdsvis 360 og 310 mm., 350 og 295 mm. og 385 og 310 mm. — Desuden fortalte nævnte Læge Bløndal mig, at han igen i Sept. 1911 havde skudt én i Nærheden af sin Gaard (Stafholtsey). — Disse hyppige Tilfælde lader formode, at Mose-Hornuglen, idet mindste til Tider, ikke er saa sjælden paa Island.

15. *Otus vulgaris* Flem., Skov-Hornugle.

Om Skov-Hornuglen, som er meget sjældnere paa Island, end foregaaende Art, har jeg kun at meddele, at et Eksemplar blev skudt ved Gaarden Efstidalur i Laugardalen paa Sydlandet, d. 8. Febr. 1908. Jeg fik den at se i Reykjavik, men fik den ikke erhvervet for Samlingen. Den maalte 360 mm. og Vingen 275 mm.

17. *Limosa lapponica* (L.), Kobbersneppe.

Af denne Fugl, som er ny for Landets Fauna (omtalt i Skýrsla 1909—10, S. 30), har Samlingen modtaget et smukt Eksemplar, en Hun i Vinterdragt, fra Hr. Faktor Nielsen. Den blev skudt i Nærheden af Eyrarbakki d. 2. Nov. 1908. Nogle Maal: Totallængde 400 mm., Vinge 215 mm., Mellemfod 58 mm., Mellemtaa 30 mm., Næblængde 91 mm.

18. *Numenius arcuatus* Meyer. Storspove.

Tandlæge Bernhøft meddelte mig, at han havde iagttaget Flokke af Storspover i Omegnen af Reykjavik, midt i Jan. 1906. Det fortælles ogsaa, at den har været i Flokke paa Østlandet i Dec. og Jan. 1909. Stud. med. M. Bjørnsson (i sin Tid Mag. Hørring's Følgesvend) meddeler mig, at han har set 5—6 Stykker nær ved Reykjavik, d. 24. Marts 1912. — Selv har jeg aldrig iagttaget den.

19. *Vanellus cristatus* Meyer. Vibe.

Viben maa vistnok betegnes som den hyppigste af „Vintertrækfuglene“ paa Island. Jeg anførte ikke saa faa Tilfælde fra dette Aarhundredes Begyndelse i min ofte citerede Beretning, og nu kan jeg føje ikke saa faa til. — I 1906 var der flere af dem paa Sydvest- og Sydlandet. Jeg saa én, som blev skudt ved Gaarden Rauðalækur i Bygden Holt paa Sydlandet, kort efter Nytaar. Omtrent samtidig (c. d. 12. Jan.) saa Tandlæge Bernhøft flere ved Reykjavik, og paa samme Tid opholdt 3—4 Fugle (maaske de samme) sig nogen Tid omkring Gaarden Gröf i Reykjavik's Nabolag. — Den 10. Jan. 1908 blev en Vibe skudt i Vogar, paa Reykjaneshalvøens Nordkyst. Den var meget mager. Et Par Dage før fandt man én sønderrevet i Grindavik. — Som ovenfor berørt, blæste der en orkanagtig Storm af SØ. paa Island, mellem Jul og Nytaar i 1908, og det lader til, at der ved den Lejlighed er blevet blæst en Mængde Fugle over til Island, deriblandt mange Viber. Kort efter Nytaar 1909 blev 4—6 Stykker iagttaget ved Reykjavik og 4 af dem efterhaanden skudt. Senere fik jeg Oplysninger om, at der samtidig var Viber i Reyðarfjord, Fáskrúðsfjord, Støðvarfjord og Lónsvik paa SØ.-Kysten, i Reykjarfjord, en af Arnarfjords Bifjorde (4 Stykker), Dýrafjord (ifølge Læge A. Fjeldsted), i Nærheden af Gaarden Langaból ved Isafjord (ifølge Cand. L. Thorarensen) og i Eyjafjord (ifølge Skolebestyrer St. Stefánsson).

Som allerede fremhævet, er Viben ret hyppig om Efteraar og Vinter paa Island, hyppigere end de andre „fremmede“ Fugle, der besøger Landet paa den Tid af Aaret, og det er ret betegnende, at den er en af de faa Fugle af denne Slags, har faaet et folkeligt Navn; den kaldes nemlig paa Sydlandet „isakráka“ eller „jöklakráka“. Jeg tror, at det er faa Aar, hvor den ikke besøger Sydlandet.

20. *Fulica atra* L. Blishøne.

Denne Fugl, som maa betegnes som temmelig sjælden paa Island, har vist sig forholdsvis hyppig i den sidste Tid. Det ældste af de her omtalte Tilfælde forekom paa Vestmannøerne,

hvor der, ifølge et Brev fra Læge Th. Jónsson, blev skudt én d. 23. Nov. 1902. Senere sendte han et Eksemplar, som blev nedlagt d. 24. Okt. 1904. — Én blev skudt i Grindavik c. d. 15. August og en anden fanget levende paa samme Sted d. 8. November 1908. — I Midten af Dec. 1910 blev én nedlagt nær ved Reykjavik og en anden (en Han) tidlig i Marts samme Aar i Bíldudal paa Vestlandet og én ved Mývatn, „hvor den“ ifølge Provst A. Jónsson „aldrig før er blevet iagttaget“. — Endelig blev der indsendt fra Vestmannøerne et Eksemplar (en Han), som blev skudt der d. 25. Nov. 1911.

Alle de her omtalte Eksemplarer er blevet indsendte til Samlingen og er voksne Individer. De fleste er blevet indsendte som ukendte Fugle paa de Steder, hvor de er blevet fanget, et indirekte Bevis for, at Blishønen ikke er en almindelig kendt Fugl her i Landet. Af de ovenfor angivne Fangsttider fremgaar det, at Fuglene viser sig hyppigst om Efteraar og Vinter.

21. *Gallinula chloropus* L. Rørhøne.

Af denne Fugl har Samlingen faaet to Eksemplarer i senere Aar; det ene blev fundet dødt ved Reykjavik d. 9. Jan. 1909, det andet (en ung Fugl) fanget levende i Bygden Hraun (se ovenfor) d. 3. Nov. 1911 og bragt hen til Byen, hvor det blev holdt i Bur en Ugestid, men døde af Mangel paa passende Føde.

22. *Ardea cinerea* L. Hejre.

I mine tidligere Meddelelser omtalte jeg (S. 16) Hejrens Optræden, særlig paa Islands Sydvestkyst. Her har jeg kun at tilføje, at jeg saa 3 Hejrer paa Vestmannøerne (Heimaey) d. 31. Aug. 1907, hvor man allerede havde iagttaget dem et Par Dage før min Ankomst. Dette er altsaa endnu et Eksempel paa, at de ogsaa viser sig her om Sommeren. — Ved denne Lejlighed fortalte vor Forenings Repræsentant paa Vestmannøerne, Hr. Guldsmed G. Lárusson mig, at han en Gang havde hørt af en ældre Bonde, fra Nabobygden Landeyjar paa Sydkysten, at en Hejre skulde have

ynglet der, paa Bredden af en lille Indsø. Hvorvidt Manden har gjort en rigtig Iagttagelse, skal jeg lade staa hen.

23. *Larus eburneus* Phipps. Ismaage.

Af denne Fugl blev et ungt 480 mm. langt, sort- og graaplettet, Individ skudt ved Gaarden Akrar i Mýrasyssel c. d. 20. Nov. 1907 og foræret til Samlingen. Ellers har jeg hverken set den eller hørt om dens Forekomst i de sidste Aar.

24. *Larus canus* L. Stormmaage.

Stormmaagen har man hidtil anset for at være en sjælden Fugl paa Island. Hantzsch betegner den (op. cit. S. 145) som „einen seltnen Gast". Jeg omtalte kortelig i „Skýrsla" 1905—07, S. 26 et Par Tilfælde, hvor den var iagttaget ved Reykjavik. — Den første Gang, jeg iagttog den, var den 6. Febr. 1906; da saa jeg en ung Fugl flyvende over Rheden, og siden har jeg set Stormmaagen næsten aarlig. I Efteraaret 1906 fik Samlingen Skindet af en ung Fugl, som blev skudt i Omegnen af Reykjavik, Oktober samme Aar. — 1907 saa jeg to Individer, det ene ungt, det andet ældre, d. 5. Januar, og d. 22. i samme Maaned saa jeg igen en ung Fugl flyvende over Rheden. — I Midten af Nov. samme Aar saa jeg to unge Eksemplarer paa samme Sted, det ene af dem blev skudt d. 20. Nov.; derefter saa jeg det andet fra Tid til anden, indtil ogsaa det blev nedlagt d. 20. Dec. Saa var der igen to unge Fugle i Tiden 25. til 28. Dec., under en Froststorm af Nord. Den 12. Jan. 1908 var der endnu 3—4. — Den 5. Dec. 1909 blev en ung Fugl skudt i Grindavik og Skindet indsendt til Samlingen. — Den 30. Jan. 1911 saa jeg 3—4 unge Fugle over Reykjavik Rhed og endelig i Aar (1912) har jeg set 3 unge Fugle d. 16. Jan. og én under en stærk, østlig Storm omkring d. 20. Febr., alle paa samme Sted.

Af disse Iagttagelser fremgaar det, at Stormmaagen er en forholdsvis hyppig Fugl i Omegnen af Reykjavik i Efteraars- og Vintermaanederne, især i Tidsrummet November—Januar, og antagelig

vilde man kunne se den ligesaa hyppig paa andre Steder paa Sydvestkysten (Vestmannøerne—Faksebugten), hvis man blot lagde Mærke til den, eller skelnede imellem den og Riden (*L. tridactylus*). — De allerfleste af de Fugle, som jeg har set, har været unge Individer, de fleste Unger i deres første Aar, enkelte ældre (Fugle i deres 2. Aar).

25. *Larus ridibundus* L. Hættemaage.

Denne Fugl, som er ny for Islands Fauna, har jeg før omtalt kortelig i „Skýrsla“ 1907—09, S. 28. Den første Oplysning om dens Forekomst i Island blev givet mig af Hr. mag. sc. R. Hørring, som hos Etatsraad Havsteen i Oddeyri (Eyjafjord) havde set Skindet af en Fugl, som blev skudt der i Nærheden en Gang i Aaret 1906, kort Tid før end jeg iagttog det første Eksemplar ved Reykjavik, hvilket fandt Sted d. 26. Dec. 1906. Der var to Individer, en gammel Fugl og en Unge; senere blev det fortalt mig af en Mand fra Gaarden Alftárós i Mýrasyssel, at en Fugl havde opholdt sig der ved Gaarden i nogen Tid i Jan. og Febr. samme Aar; efter Beskrivelsen at dømme maa det have været en ung Hættemaage.

Da min Opmærksomhed nu en Gang var vakt, saa viste det sig snart, at Fuglen ikke var saa sjælden. — Allerede d. 15. Jan. 1907 saa jeg tre Fugle, ved Stranden i Reykjavik, to gamle og en ung. Den 22. Jan. var der endnu to; saa fjernede de sig fra Land, men blev sete længere ude paa Rheden. Den 21. Marts saa jeg igen en enkelt Fugl under en Storm af SV. En Gang i Efteraaret det samme Aar blev et ungt Eksemplar skudt i Nærheden af Reykjavik og erhvervet for Samlingen. — Næste Aar, 1908, saa jeg ingen ved Reykjavik, men d. 5. April blev en Fugl i Vinterdragt (eller en ung Fugl) set ved Isafjord (L. Thorarensen), og omtrent samtidig blev en Fugl i Foraarsdragt skudt i Lodmundarfjord paa Østlandet og foræret til Samlingen af Hr. Apotheker Eriksen i Seydisfjord. — I Efteraaret 1909 var de igen ved Reykjavik; jeg syntes, jeg saa to eller tre Fugle paa

Rheden, d. 1. December[1]); i de følgende Dage (3. og 6. Dec.) blev der skudt to Eksemplarer; det var unge Fugle. — Det næste Aar (1910) hverken saa eller hørte jeg noget til Hættemaagen, men i 1911 viste den sig igen, og denne Gang som en rigtig Sommergæst. Hr. J. Havsteen i Oddeyri bragte mig nemlig et smukt Skind af en Hættemaage, en voksen Hun i Foraarsdragt; den blev skudt ved Oddeyri d. 20. Juni. Man havde set den 3 Dage i Forvejen sammen med Terner, snart ude paa Markerne, snart nede i Stranden. Et Par Dage senere saa man en anden Fugl af samme Slags.

Det maa endogsaa anses for sikkert, at Hættemaagen har ynglet paa Island denne samme Sommer (1911). Jeg var ude paa en Rejse i Slutningen af August, men da jeg kom hjem, fik jeg hos min Præparator at se to Eksemplarer af denne Fugl, en ældre Fugl (en Hun?) i Fjerskifte og en Unge, som endnu havde Dunduskene siddende rundt om paa Legemet. Et Par unge Mænd havde været med Fuglene hjemme hos mig, medens jeg var borte, men havde saa betroet dem til Præparator, som desværre undlod at notere Fangststed og Datum, da de to unge Mennesker vilde være der snart igen for at hente Fuglene; men de har ikke vist sig til Dato. Fuglene opbevares foreløbig i Samlingen[2]). Jeg giver her nogle Maal af dem for at vise Ungens Størrelse i Forhold til den Voksne; jeg er nemlig af den Formening, at det her drejer sig om en Moder og dens Unge, og at Ungen er vokset op her i Landet, og da uden Tvivl et eller andet Sted paa Sydvestlandet, thi jeg kan ikke tro, at en Unge, som endnu ikke er helt fri for Dunbeklædningen, er fløjet over til Island fra andre Lande saa tidlig paa Aaret[3]).

---

[1]) Naar jeg ikke kan afgøre med blotte Øjne, hvilke Fugle jeg har for mig, søger jeg at afgøre Sagen ved Hjælp af en god Teaterkikkert.

[2]) Da Manuskriptet laa færdigt til Afsendelse, fik jeg endelig at vide, at begge Fuglene blev skudt ved Thingvallasøens sydlige Bred, hvor de havde været en længere Tid. Det var c. d. 20. August.

[3]) Senere har jeg bragt i Erfaring, at en Hættemaage har ynglet ved Stokkseyri baade i 1911 og 1912. Et Æg fra 1911, som skal til-

Maalene er følgende:

	Moderen?	Ungen
Totallængde[1].	355 mm.	350 mm.
Vinge	290 —	260 —
Hale	110 —	110 —
Næb	30 —	25 —
Næbhøjde.	9 —	6 —
Mund.	43 —	39 —
Mellemfod	41 —	40 —
Mellemtaa	30 —	32 —

Af de her givne Oplysninger om Hættemaagens Forekomst paa Island fremgaar det, at den ingenlunde er nogen sjælden Gæst der, og da man ogsaa sikkert kan gaa ud fra, at den indfinder sig uden at Folk lægger Mærke til den eller skelner den fra Rider, saa maa den vistnok betegnes som en ret hyppig Gæst og lejlighedsvis endogsaa ynglende paa Island. Men jeg faar det Indtryk af dens Optræden, at det først er i de sidste Aar, at den begynder at vise sig saa hyppig, m. a. O. at den er ved at immigrere, maaske opmuntret af det forholdsvis milde Vejrlig paa Island i de sidste Aartier. Ellers vilde det være lidt underligt, at man ikke havde lagt Mærke til den før end i 1906.

26. *Larus minutus* Pall. Dværgmaage.

Ogsaa denne, for Islands Fauna ny, Fugl har jeg omtalt før („Skýrsla“ 1909—10, S. 30). Den blev iagttaget blandt en Flok Rider i Nærheden af nogle Klipper (Thridranger) Vest for Vestmannøerne d. 28. Mai 1909 af nogle Vestmannøfiskere, som slog den ihjel og forærede den til Samlingen. — Eksemplaret er en ung Hun med mørke Vingekanter og Skuldre. Det er 290 mm. langt, Vingen 235, Mellemfoden 31, Mellemtaaen 20 og Næbbet 20 mm.

---

falde Samlingen i Reykjavik, opbevares for Tiden hos Faktor P. Nielsen, medens Reden desværre blev plyndret i 1912.

[1] Maalt paa den opstillede Fugl, og derfor unøjagtig.

27. *Puffinus major* Faber. Storskraape.

Jeg meddelte i mine Optegnelser vedrørende Fuglelivet paa Havet omkring Island[1]), at jeg havde iagttaget denne Fugl flere Steder Syd for Island i Sommeren 1903 og 1904, men det varede længe, inden jeg kunde faa fat i den. Endelig i 1910 fik min Præparator to Fugle hos en islandsk Fiskerskipper, som havde fanget dem i Isafjords Dyb en Gang i August. Det ene af disse Eksemplarer blev erhvervet for Samlingen. Det er en voksent Individ, som m. H. t. Farve stemmer godt overens med Beskrivelsen hos Kolthoff og Jägerskiöld[2]). Dens Totallængde er 485 mm., Vingen 310, Mellemfod 62, Mellemtaa 70, Næb 45 mm.

Vestmannøfiskere mener, at de ser den af og til ved Vestmannøerne.

28. *Tadorna cornuta* (Gmel.). Gravand.

Af Gravanden har jeg set 3 Eksemplarer i de senere Aar; et Par (Han og Hun) blev skudt paa Vatnsleysustrønd i November 1906 og opbevares hos Privatfolk her i Byen; det tredje Eksemplar, en Hun, blev nedlagt ved Eyrarbakki, d. 9. Okt. 1909 og foræret til Samlingen af Faktor Nielsen.

29. *Somateria spectabilis* (L). Pragtedderfugl.

En voksen Han blev fanget i Stenbidergarn ved Reykjavik d. 4. Mai 1907. Uheldigvis fik Samlingen kun Hovedet af den. I Vinteren 1910 blev nogle Hanner iagttaget i Nordfjord paa Østkysten, ifølge Oplysninger, givet mig af Folk der paa Stedet. Forleden Vinter (1912) skal der have været en Han paa Reykjavik Rhed. Hunnerne skelner Folk næppe fra den almindelige Edderfugls Hunner.

30. *Podicipes griseigena* (Bodd.). Graastrubet Lappedykker.

I „Skýrsla“ 1905—07, S. 26, meddelte jeg, at en Graastrubet Lappedykker, en yngre Hun, var blevet skudt paa Skerjafjord, nær

---

[1]) Vidensk. Meddel. Naturhist. Foren. i København, 1907, S. 29—32.

[2]) Nordens fåglar, 1898, S. 299.

ved Reykjavik, d. 27. Jan. 1906. Dagene i Forvejen havde der blæst en stærk Storm af Syd og Sydvest. Den 13. Jan. 1909 blev et Eksemplar, en Han, nedlagt ved Gaarden Hjalli i Bygden Ølfus paa Sydlandet og af Faktor Nielsen, foræret til Samlingen, hvor ogsaa det andet Eksemplar opbevares.

Ifølge Hr. Lehn Schiøler[1]) er endnu et tredje Eksemplar fundet paa Island i senere Aar, nemlig af Hr. Præparator G. Dinesen, paa Eyjafjord i Juni 1907. Dette Eksemplar tilhører, ifølge Lehn Schiøler, Racen *P. griseigena*, var. *major* Temm. & Schl. Jeg har underkastet Samlingens to Eksemplarer en nærmere Undersøgelse; de viser følgende Maal:

	Skerjafjord-Eksplr.	Hjalli-Eksplr.
Totallængde	500 mm.	500 mm.
Vingelængde	193 —	190 —
Mellemfod	61 —	62 —
Ydertaa	65 —	68 —
Næblængde	50 —	50 —

Disse Maal tyder nærmest paa, at ogsaa disse to Individer tilhører Racen *major*, skønt Fodens Dimensioner er temmelig smaa og nærmer sig til den typiske Form. Paa Skerjafjord-Eksemplaret var Næbbet citrongult ved Roden, lyst olivengrønt fortil og mørkt paa Ryggen; Iris citrongul; de 14 yderste Svingfjer sorte, de inderste 4 med en lys Plet paa Spidsen.

31. *Alca torda* L. Alk.

I Oktober 1909 blev der i Álftafjord (Isafjords Dyb) paa Vestlandet fanget en hvid Afart af Alken og erhvervet for Samlingen af Cand. L. Thorarensen i Isafjord. En saadan Varietet af Alken er vistnok meget sjælden her oppe og den eneste, jeg har set eller hørt tale om. Den viser følgende Dimensioner: Totallængde c. 396 mm., Vinge 175, Mellemfod 27, Mellemtaa 37, Næblængde 29, Næbhøjde 16 mm.

[1]) Dansk Ornithol. Foren. Tidsskr. V, S. 147 ff.

Fuglen, som er et ungt Individ, er helt hvid, undtagen Fødderne, som er blegrøde, og Næbbet, som er kødfarvet paa Overkæben, og Underkæbens bageste Halvdel, mens dens forreste Halvdel er lysegraa, og Grænsen mellem de to Farver er en lige, lodret Linie.

Jeg har i det foregaaende omtalt nogle Fugle, som enten er sjældne eller ny for Islands Fauna, og skønt denne Beretning hovedsagelig er indskrænket til de sidste 6—7 Aar og til Reykjavik og dens nærmeste Omgivelser, saa frembyder den ikke saa faa Nyheder. Havde man øvede Iagttagere med noget Kendskab til Fugle paa flere Steder i Island, end det nu er Tilfældet, saa vilde der sikkert fremkomme langt flere interessante Ting. Og jeg véd, at der i den sidste Tid er blevet iagttaget flere Fugle, som uden Tvivl er hidtil ukendte eller da meget sjældne her i Landet. Men de Beskrivelser, som Folk giver af Fugle, saavel som af andre Dyr, plejer at være saa mangelfulde, at det som Regel er vanskeligt, eller umuligt at afgøre Fuglens Identitet paa Grundlag af dem alene.

25.—11.—1912.

Bemerkungen über Spenglers Unionen.

Von

Dr. ***F. Haas.*** — Frankfurt am Main.

(Mit Tafel III.).

Durch Literaturstudien über palaearktische Najaden gelangte ich auch zur Kenntnis von L. Spenglers, in den Skrivter af Naturhistorie-Selskabet, III., 1793, veröffentlichter Arbeit „Om Slaegterne *Chama*, *Mya*, *Unio*". In dem genannten Schriftchen werden, auf Seite 51—69 (die vier letzten Seiten sind irrtümlich mit den Zahlen 56—59 paginiert), 8 neue *Unio*-Arten beschrieben und 6 ältere Arten mit abgehandelt, und zwar in folgender Reihenfolge:

No. 20. *Unio margaritiferus* L. Europa und Nordamerika.
No. 21. *Unio auricularius* Spengl. Ostindien.
No. 22. *Unio violaceus* Spengl. Nordamerika.
No. 23. *Unio crassus* Retz. Tranquebar.
No. 24. *Unio tumidus* Retz. Dänemark.
No. 25. *Unio pictorum* L. Tranquebar.
No. 26. *Unio conus* Spengl. Tranquebar.
No. 27. *Unio radiatus* Müll. Ostindien.
No. 28. *Unio delphinus* Spengl. Tranquebar.
No. 29. *Unio gibbus* Spengl. Tranquebar.
No. 30. *Unio testudinarius* Spengl. Tranquebar.
No. 31. *Unio truncatus* Spengl. Tranquebar.
No. 32. *Unio musivus* Spengl. Deutschland.
No. 33. *Unio corrugatus* Müll. Tranquebar

Die Spenglerschen neuen Arten wurden nie abgebildet und bildeten deshalb, da ihre Diagnosen keine einwandsfreien Identifizierungen gestatteten, lange Zeit, und sogar teilweise bis jetzt, einen schweren Ballast in der Systematik. Aber auch die von Spengler besprochenen Arten anderer Autoren blieben mehr oder weniger rätselhaft, da europäische Formen wie *U. crassus* oder *U. pictorum* als in Tranquebar gefunden aufgezählt wurden. Erst Mörch, der die im Kopenhagener Zoologischen Museum aufbewahrten Spenglerschen Muscheln vergleichen konnte, machte in verschiedenen Veröffentlichungen über einen Teil derselben aufklärende Bemerkungen, doch blieben immerhin *Unio auricularius* und *violaceus* unbesprochen. Ausserdem wurden die Mörchschen Notizen wenig bekannt, da sie zum Teil in Arbeiten über ganz andere Themen eingestreut sind, sodass Simpson noch im Jahre 1900 in seiner Synopsis of the Najades die Arten *musivus*, *conus*, *delphinus*, *gibbus* und *truncatus* unidentifizierbar nennt.

Um die Stellung der Spenglerschen Unionen im System definitiv festzulegen und um die Angaben Mörchs nachzuprüfen, bat ich die Direktion des Zoologischen Museums in Kopenhagen um Überlassung der Spenglerschen Typen und Originale, und erhielt dieselben durch die Freundlichkeit meines Kollegen Ad. S. Jensen nach Frankfurt zugeschickt, wo ich an Hand des reichen im Senckenbergischen Museum vorhandenen Vergleichmateriales zu den Resultaten kam, über die ich im Folgenden berichten werde.

1. *Unio margaritiferus.*

Spengler o. c., p. 52, No. 20.

Die von Spengler stammenden Exemplare sind typische Vertreter von *Margaritana margaritifera* L., die keiner weiteren Besprechung bedürfen. Spengler erwähnt in seinem Texte, dass *U. margaritifer*, die „Europaeiske Perle-Musling“, welche hauptsächlich in Deutschland und Norwegen vorkomme, von allen conchyliologischen Autoren erwähnt werde, dass diese aber, mit alleiniger Ausnahme von Lister (Hist. Conchyl. Tab. 149, fig. 4), nie die

indische Flussperlmuschel citierten. Seine Stücke scheinen aus Norwegen zu stammen, denn, bei Besprechung einer „Varietet af *Unio margaritiferus*“ aus dem „spanske Amerika“, vergleicht er letztere mit der vorher erwähnten „Norske“. Was diese Varietät aus Spanisch Nord-Amerika selbst anbelangt, so unterscheidet sie sich in Nichts von typischen *Marg. margaritifera*; sie kann ja aus Nord-Amerika sein, doch ist sie dem Aussehen nach von europäischen Exemplaren nicht zu unterscheiden. Die von Spengler angegebenen zwei angewachsenen Perlen in der linken Schale sind sehr deutlich zu sehen, desgleichen auf der Oberfläche die vorstehenden Rippen, die die stark ausgeprägten Arealkanten darstellen.

2. *Unio auricularius.*

Spengler, o.c., p. 54, No. 21. — Simpson, Synopsis of the Najades, 1900, p. 676 und 678. — Haas, Nachbl. d. deutsch. mal. Ges., 1909, Beilage 2, p. 20.

Testa crassa, oblonga, tunicata, rugosa, in medio sinu retusa & linea longitudinali lateribus depressa.

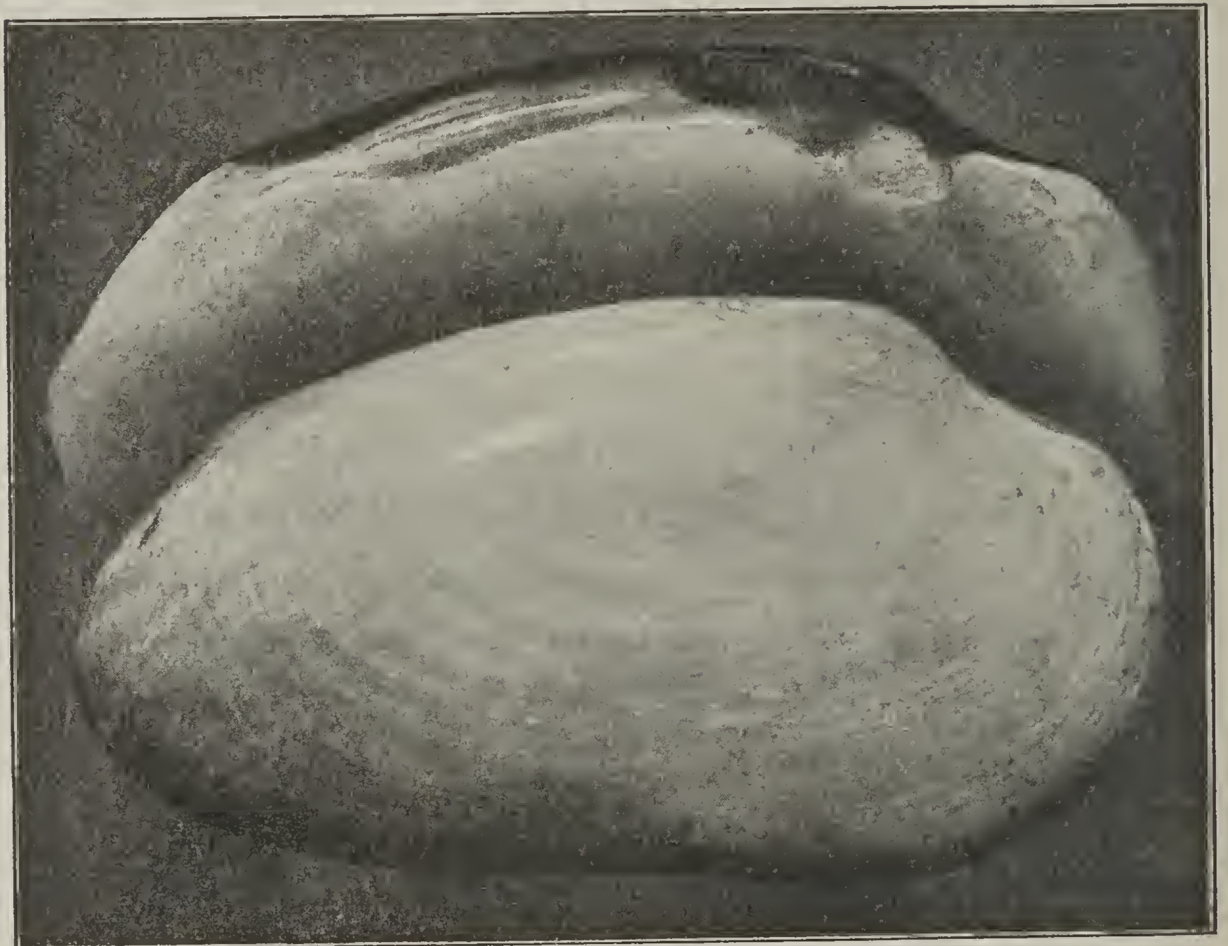
Diese Art ist nach Spengler die vorhin erwähnte indische Flussperlmuschel. Sie unterscheidet sich von der europäischen hauptsächlich durch den Besitz von leistenförmigen Zähnen unter dem Ligament, wiegt 10 Lot, ist 5 Zoll lang und 2³/₄ breit. Die starke Schalenbildung ermöglicht es, diese Art ganz bis auf das Perlmutter abzuschleifen. Spengler glaubte, seine Art auch fossil zu besitzen, und zwar in Steinkernen mit noch aufsitzendem Perlmutter, die von Berlingen am Untersee in der Schweiz stammten.

Dies ist im kurzen Worten der Inhalt der Spenglerschen Beschreibung von *Unio auricularius.* Der Schlusssatz, in dem Berlingen am Untersee erwähnt wird, verleitete Westerlund[1]) dazu, die Spenglersche Art als *U. sinuatus* Lam. anzusprechen, zumal auch die kurze lateinische Diagnose Spenglers auf die Lamarcksche Spezies passte, und liess ihn übersehen, dass nur die

---

[1]) Fauna der in der palaearktischen Region lebenden Binnenconchylien, VII, 1890, p. 50.

Fossilien von Berlingen kommen sollten. In meinem oben erwähnten Artikel im „Nachrichtsblatt" stellte ich Westerlunds Irrtum klar und beanspruchte *U. auricularius* als unidentifizierbar exotische Art. Umso erstaunter war ich, als sich das mir übersandte Spenglersche Stück von *U. auricularius* — es ist eines der im Text erwähnten abgeschliffenen — dennoch als *U. sinuatus* erwies und zeigte, dass Westerlund in seinem Irrtum doch das Richtige getroffen hatte. Um weitere Zweifel zu beseitigen, lasse ich hier die Abbildung von *U. auricularius* folgen.



Textfigur 1. *Unio auricularius* Spglr. $^2/_3$ d. nat. Gr.

3. *Unio violaceus.*

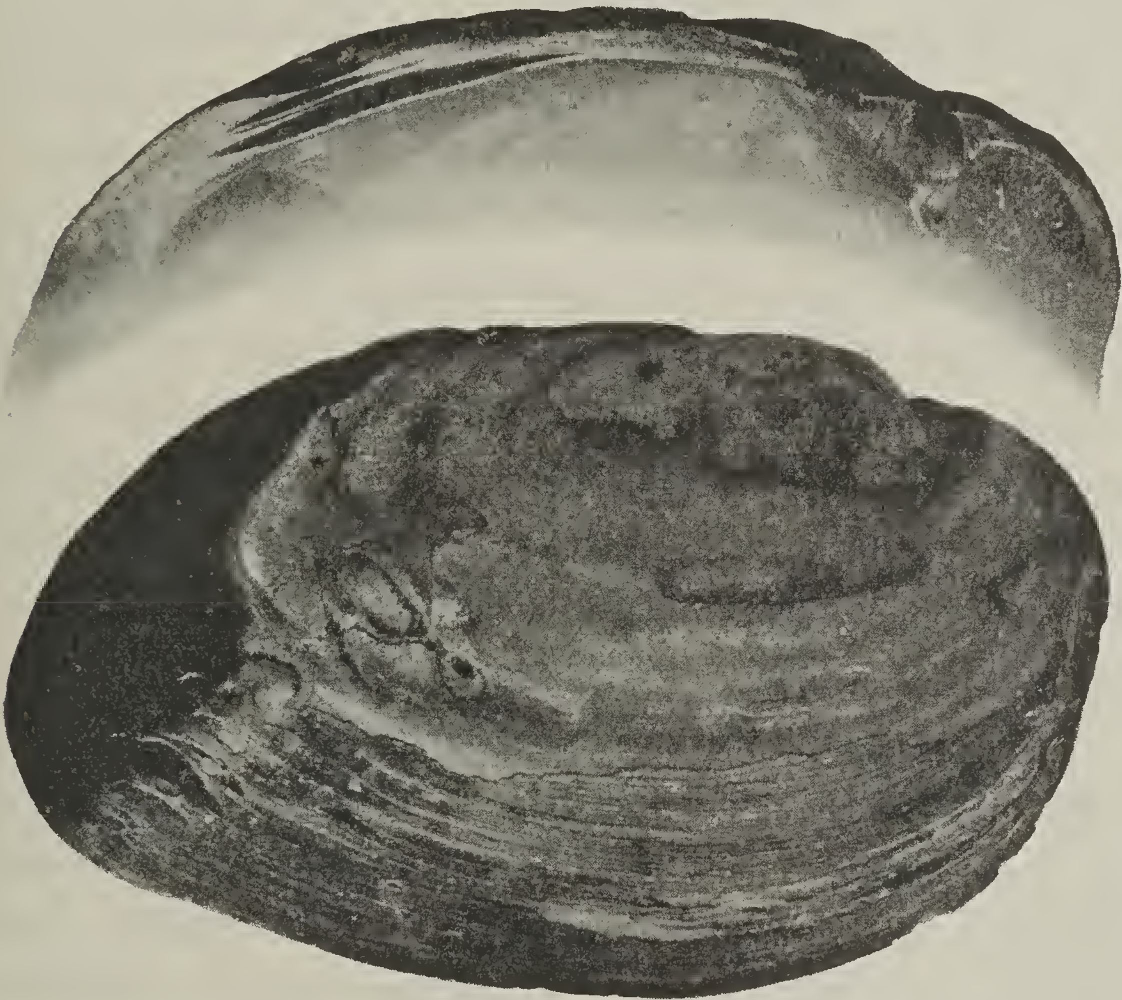
Spengler, o. c., p. 55, No. 22. — Simpson, Synopsis of the Najades, 1900, p. 721.

Testa crassa, oblonga, antice hinc angulose flexa interne violacea.

Diese Art, die aus Nord-Amerika stammt, zeichnet sich durch eine Verbiegung am Hinterende aus, durch die auf der einen Klappe eine Erhöhung, auf der anderen eine Vertiefung entsteht;

ausserdem ist sie durch schön violettes Perlmutter charakterisiert. Da nach Linné das schiefgedrückte, dreieckige Hinterende ein Kennzeichen der Gattung *Tellina* ist, so ist es zu verstehen, dass Spengler diesen *Unio* aus England als solche zugeschickt bekam.

Die Nachprüfung des Spenglerschen Stückes ergab, dass es sich um ein abnorm kurzes und verkrümmtes Exemplar von *Elliptio complanatus* handelt, der in Nord-Amerika weit verbreitet ist. Der



Textfigur 2. *Unio violaceus* Spglr.

Name *complanatus* wurde erst 1786 in dem anonym erschienenen Portland Catalogue veröffentlicht, nachdem er schon lange Zeit in einem nie publizierten, jetzt im Britischen Museum befindlichen Manuskripte Solanders gestanden hatte. Erst Dillwyn kommt als Autor in Betracht, da er in seinem „Descriptive Catalogue of recent shells" von 1817 auch *Unio complanatus* anführt. Nach den bisher gültigen Nomenklaturregeln müsste dieser Name durch den Spenglerschen ersetzt werden, doch lässt er sich als altgewohnt, allgemein bekannt und bisher nie angefochten vielleicht halten.

Schon Simpson führt (l. c.) *U. violaceus* unter der Synonymie von *U. complanatus* an, allerdings mit Fragezeichen, doch dass er richtig gehandelt hat, soll beifolgende Abbildung beweisen.

4. *Unio crassus.*

Spengler, o. c.. p. 56, No. 23. — Mörch, Journ. de Conch., 1872, XX, p. 344.

„Eiförmig, dick aufgeblasen, bauchig und dickschalig. Wirbel etwas angefressen. Von inwendig gleicht diese Muschel vollkommen den beiden vorausgehenden Perlmuscheln. Obwohl sehr dickschalig, ist er doch nur $2^1/_2$ Zoll lang und 1 Zoll 4 Linien breit. Er kommt aus Tranquebar.“

Aus dieser Beschreibung geht hervor, dass Spengler tatsächlich einen *U. crassus* oder doch wenigstens einen Vertreter der *crassus*-Gruppe vor sich hatte. Die Muschel, die im Zoologischen Museum zu Kopenhagen als Spenglerscher *Unio crassus* aufbewahrt wird, ist aber ein altes Stück von *Parreyssia corrugata* Müll., der wir später unter dem Namen *Unio corrugatus* noch begegnen werden. Das erwähnte Exemplar zeigt auf den abgeriebenen Wirbeln fast gar nichts mehr von der zickzackförmigen Skulptur, die für die Art charakteristisch ist. Die Verwechslung dieser *Parreyssia corrugata* mit dem Spenglerschen Exemplar von *Unio crassus* muss schon weit zurückliegen, denn Mörch bemerkt (l. c.) in einem Artikel über die Mollusken der ehemaligen dänischen Kolonien in Indien zu *U. crassus*: Espèce, qui provient de Tanger (Maroc). Ich schliesse hieraus, dass er in dem Spenglerschen Kästchen für *U. crassus* die erwähnte alte *Parreyssia corrugata* vorfand, die er, bei dem Mangel an typischer Zickzackskulptur auf den abgeriebenen Wirbeln, mit nordafrikanischen Formen des *Unio littoralis* verwechselte.

5. *Unio tumidus.*

Spengler, o. c., p. 57, No. 24. — Mörch, Syn. Moll. terr. et fluv. Daniae, 1864, p. 77; Malak. Blätter 1. 1865, p. 113.

Als alleinigen Fundort dieser Art gibt Spengler die Süsswasser-Seen in Seeland an Nach Mörch (l. c.) kommen die

gewaltigen Stücke von $4^1/_2$ Zoll Länge (11,7 cm), die Spengler erwähnt, aus dem Lundehuus-See in Seeland. Es ist nicht unwichtig festzustellen, dass die seeländischen *U. tumidus* als die typischen Vertreter dieser Art anzusehen sind, da Retzius die Exemplare, auf die er seine Diagnose aufbaute, von Spengler erhielt.

6. *Unio pictorum.*

Spengler, o. c., p. 59, No. 25. — Mörch, Journ. de Conch., 1882, XX, p. 344.

„Diese allgemein bekannte Muschel findet sich nicht nur in den europäischen, sondern auch in den indischen Flüssen vor. Verschiedenheiten in Grösse, Gestalt, Farbe u. s. w. haben den Autoren unbegründeten Anlass zum Zweifeln gegeben, ob alle diese Varietäten auch wirklich echte Malermuscheln seien. Mein Exemplar, das von Tranquebar kommt, ist lang und schmal. Die Haut, womit es bekleidet ist, ist schön glänzend olivenfarben, und die Wirbel sind von dieser Haut nicht entblösst, sondern sind mit kleinen Vorsprüngen besetzt. Es ist $3^1/_2$ Zoll lang und $1^1/_2$ Zoll breit.“

Die Spenglerschen Stücke sind echte *Unio pictorum* und müssen deshalb europäischer Herkunft sein; auch Mörch (l. c.) hebt dies hervor. Durch Vergleichung mit dänischen Exemplaren der Malermuschel glaube ich bestimmt annehmen zu dürfen, dass auch die Spenglerschen Stücke aus seinem Vaterlande stammen.

7. *Unio conus.*

Tab. III. Fig. 2.

Spengler, o. c., p. 60, No. 26. — Mörch, Syn. Moll. terr. et fluv. Daniae, 1864, p. 77; Journ. de Conch., 1872, XX, p. 344. — Westerlund, Fauna Moll. terr. et fluv. Sueciae, Norvegiae et Daniae, 1871, p. 573; Sveriges, Norges, Danmarks och Finlands Land- och Sötvatten-Mollusker, 1884, p. 66; Syn. Moll. Extramar. Scandinaviae, 1896, p. 164. — Simpson, Synopsis of the Najades, 1900, p. 682 u. 744.

Testa ovato-cuneata, antice coarctata, cardinis utroque dente crenulato.

„Eine dieser Muscheln ist auf der obersten Seitenfläche mit fremden Körpern belegt, die wie eine unbekannte *Flustra* aussehen. Diese Fremdkörper bestehen aus doppelten Reihen von kleinen, weissen, runden, mit einander verkitteten Kreisen, die in der Mitte hohl sind. Die Länge der Muschel ist 2 Zoll 4 Linien, ihre Breite 1 Zoll 4 Linien. Sie kommt von Tranquebar."

Schon Mörch hat 1864 (l. c.) festgestellt, dass diese angeblich aus Tranquebar stammende Muschel europäischen, ja sogar dänischen Ursprunges ist. In der genannten Arbeit führt er *Unio conus* noch als eigene Art an, die zu *U. tumidus* in demselben Verhältnis stehen soll, wie *U. limosus* zu *U. pictorum*. In der im Journal de Conchyliologie, 1877, erschienenen Abhandlung über die Mollusken der ehemaligen dänischen Kolonien in Indien betrachtet Mörch die Spenglersche Art als Varietät des *U. tumidus*, der er den Namen *pumilio* gibt. Von Westerlund wird, in den drei oben citierten Werken, *U. conus* als var. *conus* zu *U. tumidus* gezogen. Simpson (l. c.) stellt ihn auf Seite 744 zu den undefinierbaren Arten, nachdem er ihn, auf Seite 682, als fraglich dem *U. pictorum* zugezählt hatte.

Ich kann in *U. conus* lediglich eine stark verkürzte, dünnschalige, leicht korrodierte Standortsform des *U. tumidus* erblicken, wie sie sich in analoger Weise in den meisten Binnenseen bildet. Aus den schwedischen Seen liegen mir ganz ähnliche Stücke vor, desgleichen aus meklenburgischen, und die dem Spenglerschen *U. conus* recht ähnliche, aber stärker dekurvierte Konvergenzform aus dem Dümmersee ist unter dem Namen *U. macrorhynchus* Bchdg. = *U. borcherdingi* Bgt. bekannt. Meiner Ansicht nach verdient aber die *tumidus*-Form der skandinavischen Süsswasserseen keinen eigenen Namen, nicht einmal als Standortsvarietät.

Das auf Taf. III Fig. 2 abgebildete Exemplar von *U. conus* zeigt die im Texte erwähnte, der Schale aufsitzende *Flustra*, die aber höchst wahrscheinlich als eingetrocknete Insekteneier zu deuten ist.

8. *Unio radiatus.*

Spengler, o. c., p. 62, No. 27. — Mörch, Journ. de Conch., 1872, XX, p. 344. — Simpson, Synopsis of the Najades. 1900, p. 535.

Testa tenui, subfusca subtilissime transversim striata. O. F. Müller.

Lister Hist. Conch. Tab. 152. fig. 7.

Chemnitz Tom. 6. fig. 7.

„Diese Muschel ist 2¼ Zoll lang, und 1 Zoll 1 Linie breit, und findet sich in Ostindien.“

Leider ist diese Art in der Sammlung des Zoologischen Museums in Kopenhagen nicht mehr vorhanden, doch lässt sich aus der citierten Abbildung im 6. Bande des Martini-Chemnitzschen Conchylienkabinettes ersehen, welche Muschel Spengler vor sich hatte. Figur 7 auf Tafel 2 des genannten Bandes stellt, nach einer Muschel „e Museo Spengleriano“, den Müllerschen *U. radiatus* dar, der höchst selten in den Malabarischen Flüssen auf der Halbinsel Coromandel gefunden wird, wie es auf Seite 23 heisst. Schon Lamarck[1]) konnte feststellen, dass diese Art aus den Vereinigten Staaten von Nordamerika kommt; die moderne Nomenklatur nennt sie *Lampsilis radiata* O. F. Müller.

9. *Unio delphinus.*

Tab. III, Fig. 5.

Spengler, o. c., p. 63, No. 28. — Mörch, Syn. Moll. terr. et fluv. Daniae, 1864, p. 78; Journ. de Conch., 1872, XX, p. 345. — Westerlund, Synopsis Moll. Extramar. Scandinaviae, 1896, p. 165. — Simpson, Synopsis of the Najades, 1900, p. 744.

Testa ovato-oblonga glabra viridis, radiis picta, cardinis dente sinistro serrato. Fig. 1650. Chemnitz Tom. X.

„Diese Muschel hat viele Schönheiten, die sie vor den übrigen in dieser Gattung auszeichnen. Im Umriss ist sie lang eiförmig und hat eine glatte, glänzende Schale. Ihre Wirbel sind breit und stark über den Rand erhaben, ihre Spitzen sind von einander

[1]) Animaux sans vertèbres, 1819, VI, p. 73.

entfernt und haben nichts von der feinen Haut verloren, womit die Schalen bekleidet sind. Der vorderste Teil der Muschel ist kreisrund und bedeutend niedriger als die Wirbel. Durch diesen Umstand erhält die Muschel etwa die Gestalt eines Meerschwein- (= Delphin) kopfes. In Bezug auf Färbung ist der Rücken lichtgrün, der Rest der Muschel hat eine sehr schöne und stark gelbe Farbe. Beide Wirbel sind grau und in ihrer ganzen Breite von einem dunkelbraunen Bande eingefasst. Inwendig sind Schlosszähne, Muskeleindrücke, Ligament u. s. w. alle wie bei der vorigen, das Perlmutter hat eine glänzend gelbe Farbe, und ein Feuer, wie eine orientalische Perle. Sie ist $2^1/_4$ Zoll lang, und 1 Zoll 2 Linien breit, und findet sich in Tranquebar."

Entgegen den Anschauungen Mörchs und Westerlunds, die in *U. delphinus* eine dänische *pictorum*-Form erblickten, kann ich als ganz sicher annehmen, dass die Spenglersche Art aus Spanien kommt, da sie von typischen Exemplaren von *U. hispanus* Moqu.-Tand., speziell von einem aus Moquin-Tandons Hand stammenden, im Senckenbergischen Museum befindlichen Stücke, nicht zu unterscheiden ist. Ich glaube, meiner Determination ganz sicher zu sein können, ebenso wie der Tatsache, dass mir auch wirklich der Spenglersche Typus von *U. delphinus* vorliegt, da die mir als solcher übersandte Muschel in allen Einzelheiten mit der Diagnose Spenglers übereinstimmt. Sie ist auf Taf. III Fig. 5, die ich mit der Abbildung von *U. hispanus* in Rossmässlers Iconographie Taf. 56, fig. 747 zu vergleichen bitte, dargestellt.

Spengler glaubte in der Martini-Chemnitz Bd. X, Taf. 175, fig. 1650, abgebildeten Muschel, der *Mya nodulosa*, seine Art wiederzuerkennen, doch stellt die genannte Figur zweifellos einen jungen *Unio pictorum* dar.

10. *Unio gibbus*.

Tab. III, Fig. 6.

Spengler, o. c., p. 64, No. 29. — Mörch, Journ. de Conch., 1872, XX, p. 344. — Simpson, Synopsis of the Najades, 1900, p. 862.

Testa obovata tumida, radiis picta, dente anali sinistro brevi, secundario tricuspidi.

„Diese Muschel verdient als eine seltsame Art in dieser Gattung erwähnt zu werden, da sie von den vorher beschriebenen so verschieden ist. Ihr Umriss ist ein schiefes Oval. Der Vorderteil ist rund wie ein Kreisbogen, der äusserste Teil des anderen Endes ist ebenfalls rund, aber bleibt für diese Seite ungewöhnlich breit und zwar durch den scharfen, hohen Rücken der Muschel. Beide Seitenflächen mit den Wirbeln sind rund, bauchig, aufgeblasen, und die letzteren haben ihre natürliche Haut nicht verloren. Die Schale selbst ist ziemlich dünn, aussen etwas uneben, und ist dunkelbraun, aber an einigen Stelle grün mit abwärtslaufenden gelben Strahlen. Inwendig ist das Perlmutter gelb, gleichsam vergoldet. Die Schlosszähne sind gezackt oder gestreift, und die zwei Zähne in der rechten Schale sind ungewöhnlich klein. Ebenso sind die Seitenzähne unter der obersten Rückenkante ungewöhnlich klein. Die runde, tiefe Aushöhlung am vordersten Muskeleindruck, der ziemlich seicht ist, fehlt hier gänzlich. Die Länge der Muschel ist $2^1/_2$ Zoll, ihre Breite $1^1/_2$ Zoll. Sie kommt von Tranquebar."

Soweit Spengler. Mörch erklärt (l. c.) diese Muschel für eine gute Art und bestreitet ihre ostindische Herkunft nicht. Simpson (l. c.) stellt sie zu den nicht identifizierbaren orientalischen Unioniden.

Noch sicherer wie bei der vorhergehenden Art kann ich bei *U. gibbus* Spanien als Heimat angeben und diesen mit *U. turdetanus* Droüet (Rossmässlers Iconographie, Neue Folge, Band VII, Taf. 189, fig. 1202) identifizieren. Bei der absonderlichen Gestalt dieser Art, wie sie Fig. 6 auf Taf. III zeigt, war die Determination besonders leicht und bestärkte mich in meiner über *U. delphinus* geäusserten Ansicht, da es viel weniger unwahrscheinlich ist, dass zwei der von Spengler behandelten Unionen spanischer Herkunft sind, als nur eine.

11. *Unio testudinarius.*

Tab. III. Fig. 1.

Spengler, o. c., p. 65, No. 30. — Mörch, Journ. de Conch., 1872, XX, p. 343. — Simpson, Synopsis of the Najades, 1900, p. 854.

Testa oblonga, glabra, fusca, subdiaphana, cardinis utroque dente ovali brevi.

„Der Umriss dieser Muschel ist ein langeiförmiges, regelmässiges Oval, beide Enden sind schmal und abgerundet.

Wenn die Muschel nicht mehr wächst und ein gewisses Alter erreicht hat, so sind nicht nur die Wirbel, die ziemlich niedrig sind, bis ins schöne Perlmutter entblösst, sondern auch ein grosser Teil der Schalenoberfläche ermangelt dann der Haut oder schwarzen Rinde. Die Wirbel oder die übrigen entblössten Teile sind hier nicht, wie bei anderen Flussmuscheln, von Würmern angenagt, sondern die Haut ist allein abgescheuert, da der schwarze Überzug ziemlich spröde ist und leicht von der Perlmutterschale abspringt. Jüngere Schalen haben ebenfalls bis aufs Perlmutter entblösste Wirbel, aber ihre Seiten, die glatt und ohne Streifen oder Falten sind, pflegen mit einer schön glänzenden Haut überzogen zu sein, die der schönsten Schildpattschale sowohl im Glanz, als auch in der Farbe ähnelt. So verschieden können Conchylien nach Alter und Wuchs sein, und deshalb geschieht es auch bisweilen, dass Autoren jüngere Exemplare, aus Mangel an genügendem Material, als neue Art beschreiben. Diese Muschel ist dünnschalig, inwendig ist ihr Perlmutter weiss, bei jüngeren Schalen etwas blaulich. Die Schlosszähne sind ziemlich klein und schmal, zackig. Der Seitenzahn ist ebenfalls kurz und schmal. Die Muskeleindrücke sind auf beiden Seiten verhältnismässig tief, und am grossen vorderen, nach der Innenseite zu, liegt noch ein kleiner Eindruck, desgleichen eine nicht tiefe Aushöhlung unter dem Seitenzahne. Bei einigen bemerkt man ansitzende Perlen. Die Länge dieser grossen Art ist $3^1/_4$ Zoll. Die Breite $1^3/_4$ Zoll. Sie findet sich bei Tranquebar."

In *U. testudinarius* haben wir endlich eine wirklich ostindische Art vor uns, die, wie Mörch (l. c.) ganz richtig erwähnt, unter dem Lamarkschen Namen *marginalis* bekannt ist, und die man jetzt der Gattung *Lamellidens* Simpson zuzählt. Auch Simpson stellt (l. c.) *U. testudinarius* zu *Lamellidens marginalis*, allerdings

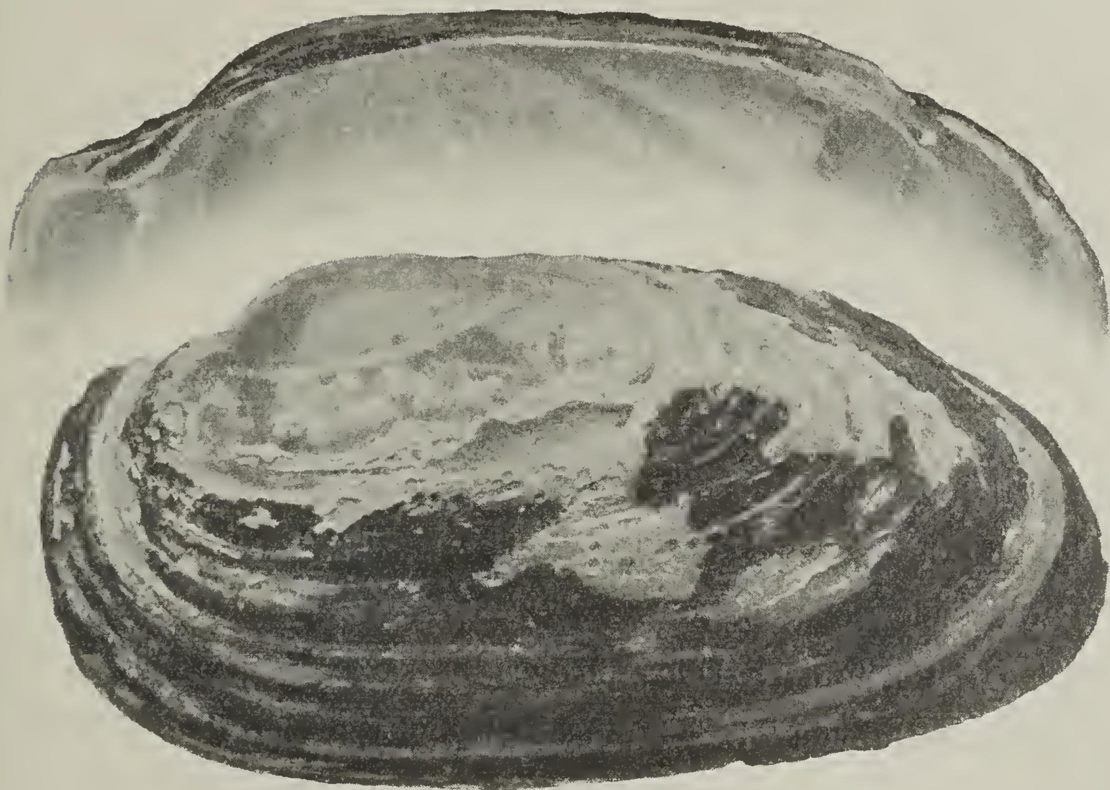
als fraglich. Die auf Taf. III, Fig. 1 folgende Abbildung der Spenglerschen Art muss aber den letzten Zweifel an der Identität mit der Lamarckschen zerstreuen.

12. *Unio truncatus.*

Spengler, o. c., p. 66, No. 31. — Mörch, Journ. de Conch., 1872, XX, p. 343. — Simpson, Synopsis of the Najades, 1900, p. 855 u. 862.

Testa ovata postice truncata, margine antico lineari, dente anali sinistro brevi, dextro majori.

„Diese Muschel ist lang und rundlich, also walzenförmig. Am Vorderende ist sie ziemlich breit und gleichsam abgestutzt. Der



Textfigur 3. *Unio truncatus* Spglr.

untere, scharfe Rand ist in seiner ganzen Länge geradlinig, das Hinterende ist schmal und abgerundet. Die niedrigen Wirbel sind bis auf das schöne Perlmutter glatt abgenagt, und ein grosser Teil beider Schalenflächen ist durch Würmer von der dicken, dunkelbraunen oder schwarzen Haut entblösst. Inwendig ist der Hauptzahn in der linken Schale breit und glatt, sowohl aus- als auch inwendig. Der Seitenzahn unter den *Nymphae* ist ziemlich schmal und kurz. Die beiden anderen Zähne in der rechten Schale sind lang, glatt und in einigem Abstand von einander. Die Muskelein-

drücke sind wie bei dem vorhergehenden *Unio testudinarius.* Das Perlmntter hat eine gelbe Farbe. Die Muschel ist 3 Zoll 4 Linien lang und 1 3/4 Zoll breit; sie wird bei Tranquebar gefunden."

In Bezug auf *U. truncatus* ist Spengler das Versehen passiert, von dessen häufigem Eintreten bei anderen Autoren er bei *U. testudinarius* spricht: er hat nämlich verschiedene Altersstadien der gleichen Muschel als verschiedene Arten beschrieben, denn seine Stücke von *U. truncatus* sind lediglich ältere Exemplare seines *U. testudinarius*, also von *Lamellidens marginalis* Lam.

13. *Unio musivus.*

Tab. III. Fig. 3—4.

Spengler, o. c., p. 67, No. 32. — Mörch, Malak. Blätter, 1865, p. 114. — Simpson, Synopsis of the Najades, 1900, p. 744. — Haas, Nachbl. d. deutsch. malak. Ges., 1910, Beilage 4, p. 62.

Testa obovata oblique tumida, dente anali sinistro duplicato, dextro simplici.

„Diese kleine Muschel ist eiförmig, und da sie dick aufgeblasen ist, so hat sie die Gestalt einer Walze. Die Wirbel sind niedrig und nahe dem Vorderende, das schmal und abgerundet ist, das Hinterende ist dagegen bedeutend breiter. Ihre Wirbel sind bis auf das Perlmutter von Würmern angenagt. Auswendig ist die Perlmutterschale von einer steinschaligen, weissen Bekleidung überzogen, die mit einer ganz dünnen, braunen Epidermide bedeckt ist. Der Schlosszahn in der linken Schale, am Wirbel, ist rund, bis unten glatt, und oben fein gestreift. Der Seitenzahn am Vorderende ist ziemlich breit. Die beiden anderen Schlosszähne in der rechten Schale sind an ihrer scharfen Kante gezackt. Der tiefe Eindruck des Muskels ist nahe am Vorderende, an der Seite des Schlosses. In ihm allein kann man am hinteren und breiten Ende die Perlmutterfarbe sehen. Diese kleine Muschelart brauchen die Nürnberger um das sogenamte „Muschelgold" aufzubewahren. Ihre Länge ist 1 Zoll 7 Linien, ihre Breite 11 Linien, und sie wird in den Flüssen Deutschlands gefunden."

In meiner oben erwähnten Arbeit glaubte ich, aus der Beschreibung des *U. musivus* entnehmen zu können, dass dieser in den Formenkreis des *U. batavus* gehöre. Auch Mörch (l. c.) hat ihn, was ich damals noch nicht wusste, mit *U. batavus* identifiziert, während er für Simpson undefinierbar blieb. Nachdem mir aber die Spenglerschen Typen von *U. musivus* — eine rechte und eine linke Schale, beide noch mit Resten von Musivgold — vorgelegen haben, ändere ich meine Ansicht dahin um, dass ich diese Art zu *U. crassus* stelle, von dem ich ebenso kleine, ganz ähnliche Stücke aus der obersten Elbe, von wo, nach Küster, die Nürnberger Spielwarenhändler grosse Mengen von Muscheln bezogen, besitze. In den Figuren 3—4 auf Taf. III ist die kleine Art dargestellt.

14. *Unio corrugatus.*

Spengler, o. c., p. 68, No. 33. — Mörch, Journ. de Conch., 1872, XX, p. 344. — Simpson, Synopsis of the Najades, 1900, p. 841.

Chemnitz, Tom. 6. fig. 22.

Schröters Fluss Conchyl. Tab. 9. fig. 3.

Beschäftigungen der Berlinischen Gesells. Tom, 6. Tab. 3. fig. 7, 8.

Die in den drei oben genannten Werken abgebildete Muschel hat zu Verwechslungen nie Anlass gegeben. Es ist die in Vorderindien weit verbreitete *Pareyssia corrugata* Müll., die in Spenglers Sammlung durch eine schöne Altersserie vertreten war. Das grösste Exemplar erwähnten wir schon bei der Besprechung des *U. crassus*, unter dessen Namen es fälschlicher Weise in dem Kopenhagener Zoologischen Museum lag.

Schlussbetrachtung.

Die 8 von Spengler beschriebenen und bisher nicht mit Sicherheit identifizierbar gewesenen *Unio*-Arten haben sich also folgendermassen herausgestellt:

Spenglerscher Name 1793	Angeblicher Fundort	Bisher gebräuchlicher Name	Wirklicher Fundort
Unio auricularius.	Ostindien.	*Unio sinuatus* Lam. 1819.	Westeuropa.
Unio violaceus.	Nordamerika.	*Elliptio complanatus* (Sol) Dllw. 1817.	Nordamerika
Unio conus.	Tranquebar.	*Unio tumidus* Retz. 1788.	Dänemark.
Unio delphinus.	Tranquebar.	*Unio hispanus* Moq.-Tand. 1844.	Spanien.
Unio gibbus.	Tranquebar.	*Unio turdetanus* Droüet 1893.	Spanien.
Unio testudinarius.	Tranquebar.	*Lamellidens marginalis* Lam. 1819.	Indien.
Unio truncatus.	Tranquebar.	*Lamellidens marginalis* Lam. 1819.	Indien.
Unio musivus.	Deutschland.	*Unio crassus* Retz. 1788.	Oberste Elbe?

Wenn bei der bevorstehenden Neuordnung der zoologischen Nomenklaturregeln die strenge Durchführung der Priorität beschlossen werden sollte, so würde diese meine Abhandlung den Spenglerschen Artnamen, die doch eine grosse Priorität bezitzen — *U. gibbus* eine solche von genau 100 Jahren vor *U. turdetanus* Droüet —, zur Gültigkeit verhelfen. Aber auch wenn die Beibehaltung eingebürgerter, lange unangefochtener Namen verfügt wird, so hat meine Arbeit doch immerhin den Wert, einmal Klarheit über die mysteriösen Spenglerschen Unionen geschaffen zu haben.

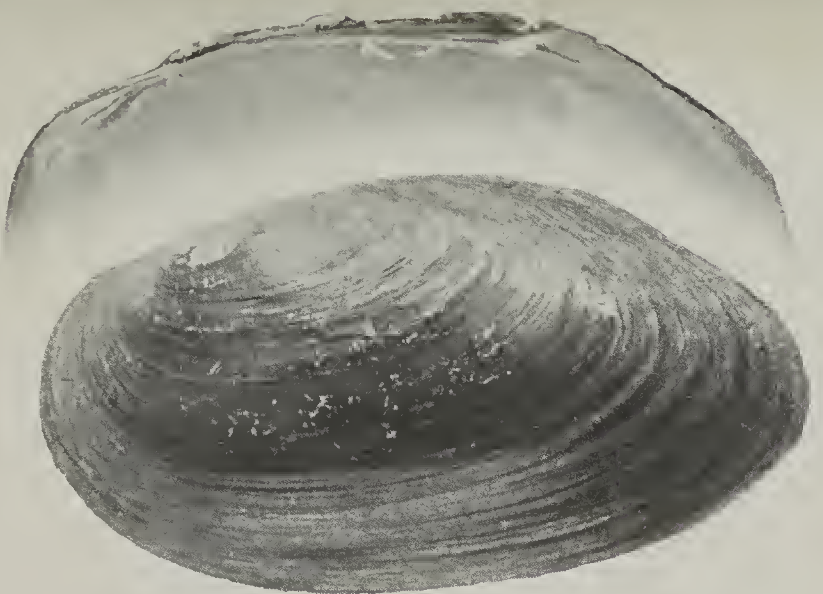
6.—1.—1913.

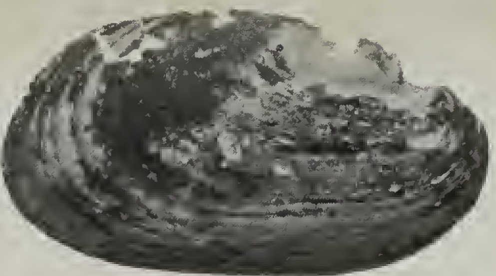
Tafelerklärung.

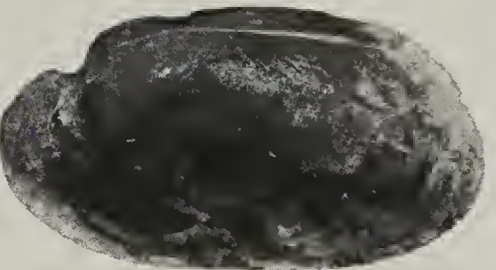
Tab. III.

Fig. 1. *Unio testudinarius* Spglr.
— 2. — *conus* Spglr.
— 3—4. — *musivus* Spglr.
— 5. — *delphinus* Spglr.
— 6. — *gibbus* Spglr.

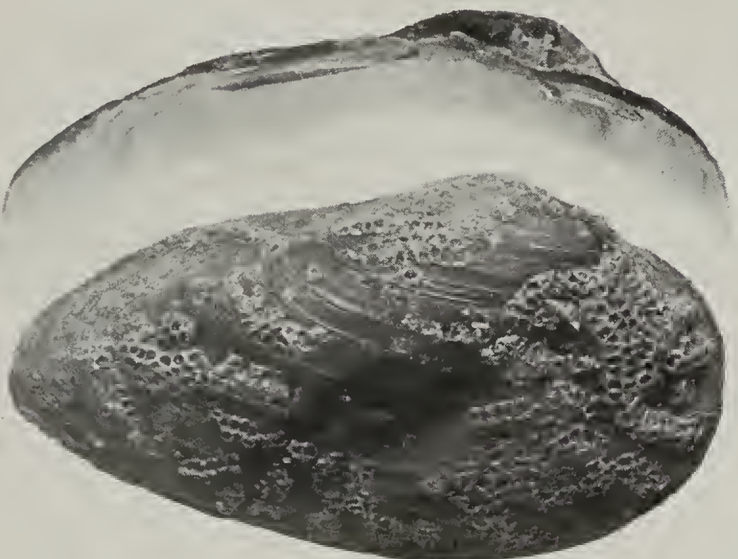
Sämtliche Figuren nach Photographien der Spenglerschen Typen, in natürlicher Grösse.

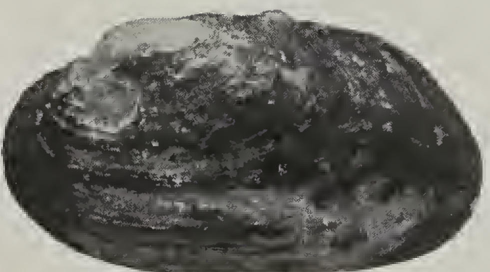

1

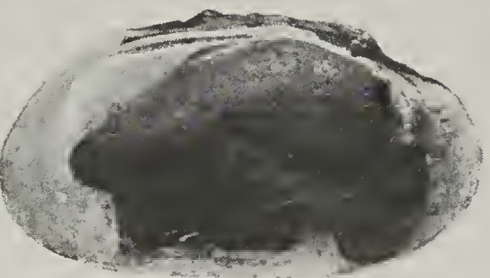


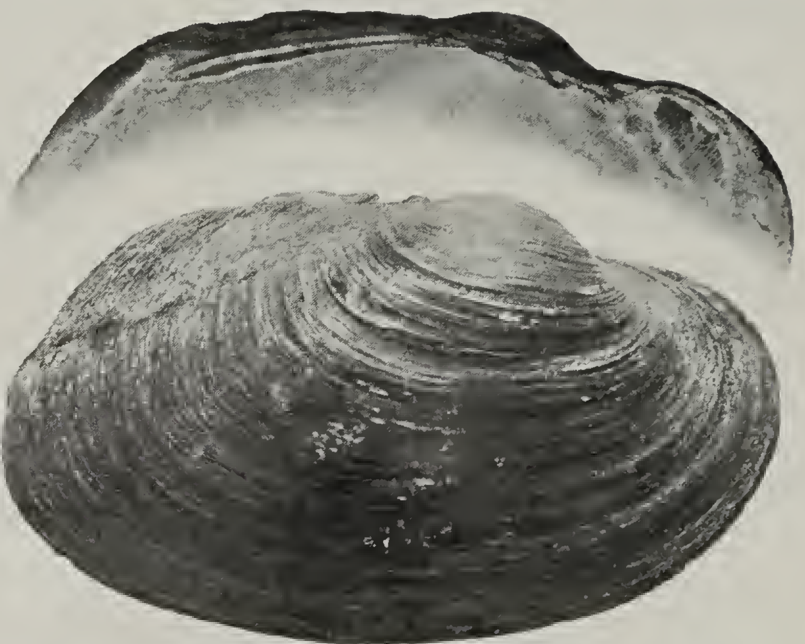

3


5


2




4


6

Pacht & Crone phot.

Typ. Bianco Luno.

1. *Unio testudinarius*; 2. *U. conus*; 3—4. *U. musivus*; 5. *U. delphinus*; 6. *U. gibbus*.

Notes on the Form of the Carnassial Tooth of Carnivorous Mammals.

(With a critical sketch of the most important tooth-cusp-theories).

By

mag. sc. ***K. S. Bardenfleth.***

No organ is more important in the systematic classification of the mammals than the tooth. The dentition ought certainly not to be the only basis of classification; but as the teeth are the only remnants of many of the fossil mammals, a classification which is not mainly based upon them will always be incomplete. And being at the same time a conservative organ, showing the original character through all alterations, as well as a plastic material, accommodating itself to the most widely differing demands, the teeth are besides well qualified to form the basis of a classification.

From an early date, therefore, we have exact comparative morphological descriptions of the mammalian teeth (Cuvier, Owen, Giebel and others). They however regard every type of tooth as an isolated phenomenon without any attempt at bringing them under the same point of view. It was only after the victorious Theory of Evolution had established the descent of the manifold types of animals from one or a few archetypes, that one began to look for the primeval type of the mammalian tooth.

Apart from the attempts of Rütimeyer and Kowalewsky the American naturalists are leading the way. In "Methods of Creation" 1871 Cope explained the complicated teeth as having been formed by "complex repetition" of an unicuspid tooth (e. g. in *Delphinus*). In 1874 he pointed out the four types: haplodont,

ptychodont, bunodont and lophodont teeth, (the two last mentioned belonging especially to the Ungulates) and he showed how the lophodont teeth can be derived from the bunodont by further development of the various cusps, a development which is accompanied by the palæontological development of the foot.

1878 Ryder tried to explain the tooth-structure from modern ideas of "evolutional teleology". The tooth-form according to him depends, not only on the nature of the food, but also on the movement of the lower jaw, and this acts also on the form of the condyle. „The earliest and simplest type of mammalian jaw-movement was that in which the mouth was simply opened and closed, without mandibular excursion, and coexistent with the simple haplodont or bunodont molar." (pag. 79). „As the excursive movements have increased in complexity, there has been an apparent increase in the complexity of the enamel foldings, ridges and crests." (pag. 80). And the differentiations are due to a „necessary, voluntary or intelligent assumption" of new life-habits (pag. 53). The various tooth-forms are produced by duplication of cusps in various directions, fusion, suppression, enlargement etc. „These [differentiations] . . . make further differentiations, which are successively fixed by the law of heredity, less difficult in succeding generations, until extremes are reached". (pag. 70).

In the same year Gaudry declared that the complicated molars of the Ruminantia were formed by fusion of several more simple teeth, the upper made up of 6, the lower of 4 or 2. This is the first appearance of the "Concrescence Theory".

In his book "Odontologische Forschungen" 1882 Baume set forth many new thoughts, which, however, are often more original than convincing. He thought he had found a „Thatsache von höchster Wichtigkeit": „Das Gebiss der Vertebraten befindet sich in steter Reduction, was die Zahl der Zähne und die Masse der Zahnsubstanzen anbetrifft. Es herrscht ein ganz bestimmtes Gesetz, welches ich das Gesetz der Reduction nenne. Das Gesetz der Reduction erklärt alle Abänderungen im Gebiss." (pag. 78). The

Selachia are tooth-clad all over the body; in the higher fishes only the mouth and pharynx have got teeth, in the amphibians they are limited to the jaws and the palate, in the higher reptiles to the jaws and as yet are replaced through life; in mammals they are confined to the jaws and no more than two tooth-generations successively appear. The mammals must be derived from the reptiles; we have therefore to look for the most primitive among the forms with the greatest production of teeth, i. e. the Edentata and Cetacea. Of these the Edentata are the more primitive, because their teeth are ever-growing like those of the reptiles, while the teeth of the Cetacea have acquired a root; the former accordingly produce more substance than the latter. Wherever we see ever-growing teeth, we find a primitive condition. Believing them to be derived from rooted teeth would oppose the law of reduction. Baume maintains the singular point of view, „dass nie ein Thier mit immerwachsenden Zähnen von einem Thier mit Wurzelzähnen abstammen kann, wohl aber umgekehrt letzteres aus ersterem. So kann zum Beispiel *Chiromys* niemals von einer der heutigen Lemuren ähnlichen Form abstammen.“ (pag. 167). It might seem to be a contradiction that the rooted teeth — which are supposed to be more reduced as to substance than the rootless, — appear in two dentitions, whereas the ever-growing are not replaced. But Baume asserts that in reality the whole principle of tooth-replacing is founded on a misunderstanding; the milk-teeth are not the predecessors of the permanent teeth, but their contemporaries; they are doomed to vanish altogether, but are still retained as tiny, early developed teeth which in process of time will entirely fail to appear. — We have thus among the Vertebrates three stages of production of tooth-substance: 1) Amphibians and Reptiles: constant loss of half-worn teeth, *overproduction of substance.* 2) Ever-growing mammalian teeth: unlimited growth, *wear and increase equalise.* 3) Rooted mammalian teeth: The growth is early accomplished, the wear is not compensated, but counteracted by the enamel; *great economy.* The reduction is accompanied by a specialisation of the

single tooth, so that it can be functionally equal to several teeth. The most primitive teeth as to form and number are the haplodont conical teeth of Cetacea and Edentata, although both of these types are somewhat specialised, the former having acquired fangs, the latter having lost their enamel; but as to form they are more primitive than those of the Triassic and Jurassic mammals. — Among the rodents with ever-growing teeth we find a more complicated tooth-form, the enamel of which forms deep vertical folds along the sides of the tooth ("Lamellenzahn"). This tooth is in the lower jaw often formed like a W. It is connected with the conical tooth by an intermediate form ("Furchenzahn") which is seen in a sligtly aberrant shape in *Orycteropus*, *Glyptodon* etc. From the ever-growing lamellar tooth all the fanged forms are derived; the W-pattern is often conspicuous and the selenodont teeth with their deep enamel-folds are not difficult to derive from the lamellar teeth; from these folded teeth the bunodont type is derived (through forms like *Phacochoerus*), the folds being more shallow and filled up with enamel. Thus the most different tooth-forms are referred to one primitive type which in its turn can be traced through the whole series of Vertebrata.

In the same year that Baume published his curious theories, H. Winge published a short paper entitled "Om Pattedyrenes Tandskifte, især med Hensyn til Tændernes Former". The first 5 pages contain his views on the development of the tooth-forms which for clearness and simplicity greatly exceed any other former or later theory; but being written in Danish it is not yet generally known nor fully appreciated. [1]) According to him, in the lower vertebrates the teeth are only used for seizing their prey; the lower jaw is moved up and down by the *musc. temporalis* and *pterygoideus*; but the mammals masticate their food, their teeth being slightly moved from side to side; the mandible is fixed

---

[1]) A short summary of this theory has been given in Max Weber: »Die Säugetiere« 1904.

through a stronger articulation and a *masseter* has been developed. The anterior teeth still being used for seizing purposes are not very modified, whereas the posterior teeth, being placed near the muscles, are enlarged. As the upper and lower teeth during mastication are rubbed against each other, cusplets are developed at the points of contact anterior and posterior to the original single conical tooth-cusp. The teeth are now tricuspid (*Spalacotherium, Amphiterium, Amblotherium, Perolestes, Achyrodon, Triconodon, Triacanthodon, Tinodon* etc.). These three primary cusps are numbered starting from the front cusp 1—2—3; the figures are purely topographical, by no means dependent on the relative age of the cusps (the reptilian cone is no. 2.). These tricuspid teeth where the lower teeth in biting touch upon the inner side of the upper — the jaws being anisognathous — are excellently suited for cutting flesh (the anterior premolars of many recent flesh-eaters have still kept this form); but the mastication of the food demands more than this. Through the friction two new cusps are developed, 4—5, on the inner side of the upper and the outer side of the lower tooth according to the accompanying diagram: where the Roman numerals indicate the cusps of the upper teeth, and the other figures the cusps of the corresponding lower teeth. Now the teeth become quinque-cuspid, as is still seen in the lower jaw of several primitive mammals (*Didelphys, Dasyurus, Cladobates, Talpa, Chiroptera* a. o.). The lower teeth never grow broader, though secondary cusps are sometimes developed at the posterior end. But the upper teeth which are placed in the broad maxilla, acquire, owing to the constant necessity for a broad grinding-surface, one cusp more, 6 (just inside 4), generally supported by a special fang (*Didelphys, Talpa* a. o.), and subsequently another, 7, behind 6 (e. g. *Sorex*). But on this broad 7-cuspid tooth the three primary cusps (1—2—3) are pushed so far aside that they degenerate and finally disappear, so that the tooth becomes quadri-cuspid. On the lower teeth 1 often disappears, its function being assumed by cusp 3 of the preceding tooth:

	1				1
I			I		4
	2	gives		IV	2
II			II		5
	3			V	3
III			III		

			1					
I		4	2			4	2	
	IV		VI		IV		VI	
II		5	3	gives		5	3	
	V		VII		V		VII	
III								

Thus we get a quadricuspid tooth above and below (the common bunodont type of Suidae, Primates etc.), but the cusps are 4—5—6—7 above, 2—3—4—5 below. Due to differences in food and grinding movements some of the cusps may be enlarged, others may be suppressed, connecting ridges and crests or less constant cusplets may be developed (Ungulates), but the fundamental form of the tooth can always be traced back to the 7-cuspid (upper) or 5-cuspid (lower) tooth of the primitive types. It is only in very rudimentary teeth such as those of Odontoceti, Pinnipedia, Edentata a. o. that the fundamental pattern is totally effaced. — This is the first time that a theory has not only tried to give but has worked out a clear, palæontologically well-founded plan, showing the differentiations of the mammalian teeth since the origin of this vertebrate class, indicating their causes and giving the homology of the cusps of the different tooth-types.

1883 Magitot takes up again Gaudry's theory that the mammalian teeth are composed of several conical teeth: „La forme initiale des dents est le cone. C'est le type primordial, l'unité dentaire. Les formes les plus complexes des organes dentaires peuvent se réduire par l'analyse en un nombre variable des éléments primordiaux ou unités, réunis par voie de coalescence.“ (pag. 88). He finds the proof in the following: „Le bulbe dentaire, en effet, est primitivement composé d'une base conoïde qui persiste ainsi pendant les premières phases de l'évolution ... Sur cette base primitive apparaissent des saillies en nombre égal aux tubercules de la couronne future.“ (pag. 86). By the coalescence of these "saillies" (outgrowths) the crown is formed. If this is intended to be large, their number is increased, if small, their number is reduced. The incisors start with three cusps, though the crown apparently is unicuspid; therefore they must be reduced, whereas the canine has preserved the primordial type. He speaks mostly

about the human teeth and does not endeavour to compare the different tooth-types or to trace the palæontological evolution.

Rost's paper "Phylogenie des Saugetiergebisses" 1883 is on the whole very good. It is more a philosophical than a comparatively morphological and palæontological criticism of Baume's theory. — Baume's "law of reduction" is to him a misunderstanding; teeth are indispensable for the vertebrates and therefore not on their way to disappear; but the limiting of the teeth from the whole epidermis of the Selachia to the jaws of the Mammalia is explained by the law of localisation of function, the specialisation of certain teeth by the law of reduction of homogenous parts under the further development of remaining parts. The primeval type of the mammalian teeth was the conical or cylindrical tooth with fangs, but without diastema. From the fact that the ever-growing tooth has the same shape at both ends it is not allowable to conclude that it is the most generalized, because a tooth which grows from an unchanged matrix must have the same form at all parts. The ever-growing teeth prove themselves to be more specialised than the teeth with fangs in being (often secondarily enlarged) sexual weapons or in having assumed a special function (rodent dentition); they are never found fossilised in the mammalian orders where they have no recent representative. The Edentata are not a primitive, but an extremely modified order which originally has had teeth with fangs, as shown by the milk-teeth of *Tatusia*. — Rost does not try to compare the tooth-forms, as Baume did.

Hitherto Cope had not been able to find a common point of view for all the forms of mammalian molars, but after the discovery of the Puerco-fauna ("Trituberculate type" 1883 and "Tertiary Vertebrata" 1884) he detected the fundamental type from which both the ungulate and the unguiculate teeth can be derived, the *trituberculate type*, and with great acumen showed the transformation of this type to even the most complicated recent teeth.

Lataste's paper "Étude sur la dent canine" 1887 is chiefly a philosophical explanation of the term "canine". In the same year

Oldfield Thomas set forth an excellent description of the relation between the tooth-formulæ of the Placentalia and Aplacentalia. As to the tooth-forms he only says that the primitive mammalian teeth were probably similar to those of Dasypodidæ and perhaps homo- and monophyodont, with no fangs.

The Concrescence Theory was in the year 1888 supported from Vienna by Dybowski. His starting-point was the ungulate molars, and he tried to show that the upper and lower molars were symmetrically constructed, but were so placed that the lateral (outer) "Jochwand" above corresponds with the medial (inner) wall below and vice versâ. „Dieses gilt für alle Säugetierzähne überhaupt." With few exceptions every mammalian tooth is composed of four main parts ("Vor"- "Mittel"- "Nach"- and "Hinterjoch"). It is true, one or more may degenerate, but all teeth — including the incisors and canine — can be traced back to the "vierjochige" construction. Every "Joch" consists of "Wand" and "Bogen". By their more or less intimate coalescence the different tooth-forms arise. This theory allows a strictly methodical homologising of every cusp and every fold. Each of the two parts of a "Joch" is composed of three more or less independent "Pfeiler", every normal tooth thus contains 24 "Pfeiler". There is every reason for believing that every "Pfeiler" corresponds with one primitive Selachian tooth: „Einem jeden 4-jochigen Säugetierzahne liegen 24 einfachen Papillen zu Grunde, aus welchen ebensoviele Pfeiler entstehen, z. B. die Zähne mit nicht zentralisiertem Zahnbeine. Indem nun je 3 Pfeiler mit einander verwachsen, entsteht je ein Halbjoch, die ihrerseits untereinander verwachsend je ein Zahnjoch bilden. Aus dem Verwachsen einzelner Zahnjoche miteinander kommt eben der zusammengesetzte, vierjochige Zahn zustande. Durch das Verkümmern einzelner Pfeiler (resp. Papillen) erklärt sich das Verkümmern oder gar Fehlschlagen der einzelnen Zahnjoche." (pag. 7).

In the same year Osborn's famous theory appeared. [1]) This

---

[1]) Of Osborn's many papers on this subject only those are cited which seem to me to give something essentially new; besides see the book of Osborn and Gregory.

is the first attempt after that of Winge to establish a complete theory of the mammalian tooth-phylogeny. Supported by Cope's investigations into the Puerco-fauna, he traced the pedigree of every tooth-cusp and formulated the following: I. The haplodont type. Crown simple and conical, fang simple, not distinguishable from the crown. This (reptilian) type has not as yet been discovered among the mammals, but leads through the protodont sub-type with lateral accessory cuspules and grooved fang (*Dromatherium*) to II the triconodont type with double fang and a distinct lateral cusp in front of (paracone, paraconid) and behind (metacone, metaconid) the central cone (protocone, protoconid), (*Triconodon*). III. Now a rotation of the lateral cusps takes place so that those in the upper teeth swing outwards, in the lower inwards; the grinding surfaces of the teeth form triangles which above turn an acute angle inwards and below outwards: tritubercular type (*Spalacotherium*, *Asthenodon*, still to be seen in *Chrysochloris*, *Centetes* a. o). From this point the evolution of the upper differs from that of the lower teeth. Behind the high primitive triangle of the lower teeth a low talonid first arises and on this two cusps are developed, hypoconid (on the outer side) and entoconid (on the inner side) and between them sometimes a third, hypoconulid, is added. — Behind the protocone (upper molars) a talon is evolved, generally with only one cusp, hypocone, and between proto- and paracone sometimes a cuspule may be developed, protoconulus, and similarly between the proto- and metacone a metaconulus. Thus we can have 6-cuspid teeth above and below, but only the three cusps in the primitive triangle are mutually homologous. — The bunodont 4-cuspid tooth consists of proto-, para-, meta- and hypocone above, proto-, meta-, hypo- and entoconid below, and so their cusps are not all homologous. Through decrease and increase of some of the cusps, development of crests (lobes), cingulum and its styli, the different tooth-forms are produced; but invariably the protocone is the foremost inner, the protoconid the foremost outer cusp.

In the following year Cope (in "The mechanical causes of the

developement of the hard parts of the Mammalia") sets forth several laws for the development of the various tooth-forms, according to which the appearance of cusps and crests is due to a more or less extensive use and consequent strain in certain directions. The primitive tooth-form is the conical, from which at an early stage the triconodont arises: „No mechanical cause can be assigned for the development of these cusps, but the nutrition of the parts probably has had an important influence on the process"; the basal cuspules being situated nearer the nutritive artery than are the remaining cuspules (*Dromatherium*) they will accordingly increase at the expense of the latter. The para- and metacone (-id) fill up the space between the teeth and the effective area of these is thus increased. The smaller cusps being least resistant to strains will be pushed to the outside of the row (outwards above, inwards below) whereas the median cone will retain its place. We thus get the tritubercular tooth which is seen in several primitive creodonts (*Didelphodus*, *Stypolophus*, *Mioclænus*) together with *Chrysochloris* and *Centetes*. From this type the tuberculo-sectorial dentition is developed as stated by Osborn. The development of the quadritubercular tooth with its four equal cusps is due to the transition to vegetable diet which is not cut, but crushed, and it is accompanied by the transition from the unguiculate to the ungulate foot-construction. — The paraconid probably decreases because the talonid during its growth draws the nutrition from it. — The quadritubercular teeth do not alternate like the sectorial.

In the following years the question of the phylogeny of the teeth specially occupies German naturalists. 1890 Schlosser's "Die Differenzierung des Säugetiergebisses" appears. He finds the primitive tooth-form represented in the teeth of the dolphins, because these animals, owing to their aquatic habits, have not been compelled to acquire the grinding habit and therefore have kept their primitive character. In the terrestrial mammals three important things happen when they are forced to masticate their food: the jaws become shorter in order to utilise the muscular power better, the tooth-number decreases in the shorter jaw, but

the remaining teeth grow more specialised chiefly in the hindermost part of the jaw, in order to serve the newer purpose of mastication better. As to the further development of the various forms he essentially has adopted Osborn's view.

In Fleischmann: "Die Grundform der Backenzähnen", 1891, we meet with opposition to Osborn's theory. He does not find this theory sufficiently proved and especially he thinks Osborn's homologising of the upper and lower tooth-cusps doubtful. The fact is that you often get the impression that the upper and lower mammalian teeth correspond with one another in inverted position, i. e. the outer border with the inner, the anterior end with the posterior etc. If this is taken as a general law, the paracone will be homologous with the metaconid etc. If a primitive molar, e. g. that of *Dasyurus*, is examined, one will observe that the upper molar has a triangular grinding surface, composed of one greater posterior outer triangle and two smaller anterior quadrangles, one at the inner and the other at the outer side, all separated by ridges. Fleischmann proposes the names macromere (posterior outer triangle), micromere (anterior outer quadrangle) and entomere (inner quadrangle) and the whole tooth is called trimerous. When looking at the lower molar we observe that it entirely wants the entomere (bimerous), and here the macromere is situated anterior to the micromere. Each of the three main parts of a tooth is supported by a fang. — The single cusps are only to be indicated by letters, the same letter being used for the homologous parts above and below. From the trimerous tooth the teeth of the carnivores, the insectivores, the bats and the lemurs can easily be derived. In the herbivorous animals the teeth usually are more complicated through the development of a metamere on the distal border of the entomere. Very often the macro- and micromere are reduced so that their outer border has disappeared (corresponding to the vanishing of cusps 1—2—3 [Winge]); the lower molars keep their form for the longest time. — As shown by Cope the teeth of the herbivores are transformed so much that the original

form can be identified only with difficulty. — About the origin of these transformations we know very little, as may be said about the derivation of the most primitive (Triassic) tooth-forms from the reptilian teeth or about their connection with the Eocene forms; that a mammalian tooth has its descent from a reptilian one is probable, but not proved.

In the same year the Concrescence Theory reaches its full development through Kükenthal's "Ursprung und Entwickelung der Säugetierzähne." The dentition of the whalebone whales, usually looked upon as primitive, can hardly be so, the hindmost teeth of the embryos being rounded, even tricuspid, so that the homodonty must be secondarily acquired. Geoffroy St. Hilaire and more especially Eschricht together with Julin and Weber have shown us the rudimentary teeth of the Mystacoceti; some of them are double, others show irregular cusplets which by Julin and Weber are interpreted as rudiments of an earlier multicuspid condition. But this cannot be so, as the cusplets are only evidence of a beginning resorption. The compound teeth-rudiments on the contrary are evidences of an earlier condition, since, as can be seen in a series of foetal jaws of the same species, the number of the tooth-cusps up to a certain time is constant (in *Balænoptera musculus* 53), whereas the number of compound teeth (2—3 cusps joined together) decreases during growth. Only when all the compound teeth, with the exception of two or three, are separated, does their resorption begin, and the number of cusps decreases. From this we see that the compound tooth is of a primitive character, and that this tooth by secondary prolongation of the jaws can be resolved into teeth with a single cusp. Therefore it may be supposed that the complex molars really derive their origin from a concrescence of unicuspid conical teeth. Evidence of this hypothesis we have f. i. in the teeth of *Triconodon*, where three homogenous cusps are placed in one longitudinal row. In the seals also we find isolated examples of the division of one tooth into two. The evolution of the mammalian teeth may be supposed to be the following: The

teeth are originally integumentary structures (Selachia), the teeth of the jaws somewhat specialised, but similar to each other; the number of the tooth-rows is unlimited. In Batrachia and Reptilia only the teeth of the mouth-cavity remain, the number of dentitions is limited, the new rows are produced only as compensation for the worn-out. In the higher reptiles the tooth-number may be constant and the single teeth somewhat specialised. The reptilian tooth-rows have in the primitive mammals become two dentitions, the milk-teeth and the replacing teeth, and the single teeth are furthermore differentiated: „Bei der eintretenden Verkürzung der Kiefer rückten die Zahnkeime der einspitzigen Reptilienzähne näher und näher aneinander und verschmolzen gruppenweise zu mehrspitzigen Zähne, den ursprünglichen Backenzähnen der ersten Säugetiere. Durch die infolge verschiedener physiologischen Leistungen geforderten Umformungen bildeten sich die Backenzähne aus, wie wir sie bei den jetzt lebenden Säugetieren kennen.“ (pag. 483). Through the palæontology the homologies of the single tooth-cusps can be traced as easily as those of the fingers and toes on the limbs. — In “Entstehung und Entwickelung des Säugetierstammes” 1891 Kükenthal calls attention to the teeth of the Multituberculata as evidence of an original fusion of several teeth into one; the multituberculate teeth are formed by one longitudinal row of functional reptilian teeth united with 1—2 rows of replacing teeth. Consequently they must be present in a small number (not exceeding six). The cause of the concrescence is difficult to trace; it is not alone due to a shortening of the jaws. — From the multituberculate teeth both the teeth of the marsupials and of the placental mammals must be derived. — If this hypothesis be correct, the Cope-Osborn theory of cusp-addition by the supplying of nourishment to certain parts of the tooth is nullified. „Nimmt man dagegen mit mir den triconodonten und tritubercularen Zahn nur als eine besondere Abteilung der multituberculaten Zähne, also als ursprünglich durch Verwachsung entstandene Bildungen an, so ist die Schwierigkeit erhoben. Die weiteren an den tritubercularen Zahntypus anschliessenden Hypo-

thesen der amerikanischen Paläontologen werden dadurch nicht berührt." (pag. 406). — But further the reptilian teeth exhibit sometimes complications to be interpreted as a clustering (*Scelidosaurus, Anthodon, Galesaurus* a. o.), they must have been formed by the uniting of several selachian teeth and probably this may be the case with all reptilian teeth. — The starting-point for the formation of the teeth is the dentine tooth of the fishes; by coalescence of several of these is formed the reptilian tooth and through reiterated coalescence of these teeth the mammalian tooth is formed; the teeth of the three classes are thus not homologous, but represent three stages in the tooth-evolution. „Damit ist zugleich der einfache mechanische Grund der allmähligen Abnahme der Dentitionen gegeben." (pag. 408).

In the numerous papers of Röse from 1892 onwards ("Zur Phylogenie des Säugetiergebisses" a. o.) the same theory is essentially set forth, supported by investigations of the embryonic development of the teeth. A multicuspid molar is not developed from a single dental papilla, but from just as many separate papillæ as the adult tooth has cusps; afterwards the enamel organ grows down like a cap around the summit of the papillæ and unites them: „Die Molaren der Säugetiere sind also entstanden durch Verwachsung mehrere einfacher, kegelförmiger Zähne zu einen komplicierten, hochdifferenzierten Zahngebilde." (Phyl. d. Säugetgeb. pag. 625). We have — it is true — no certain palæontological evidence of that; though it must be remembered, „dass die Paläontologie lediglich in positiver Hinsicht beweiskräftig ist, niemals aber in negativer" (pag. 629); the assertion of the palæontologists that the origin of a true cusp can be traced back to a small basal knob is of no great significance, for it can be shown in the marsupials that each of the basal knobs originates from its own separate papilla. The embryological positive evidence must weigh more heavily than the palæontological negative. — Of the reptilian teeth the unicuspid are certainly homologous with the fish-teeth, the multicuspid are homologous with the thekodont reptilian teeth.

During the long foetal life and the suckling period two of the first dentitions get an opportunity of developing to such an extent that the succeeding dentitions do not reach any development at all: „Es enthalten nun schon die einfachen Frontzähne des Milchgebisses gleichsam in nuce eine ganze Reihe von früherer, durch Abkürzung in der Entwickelung verloren gegangener Dentitionen. Man muss sich vorstellen, dass gleichsam das Material, das früher zur Ausbildung vieler rasch hinter einander folgenden Kegelzähne der Reptilien verwandt wurde, aufgespeichert ist und verwendet wird zum langsamen Aufbau eines besser ausgebildeten Zahnes.“ (Entsteh. u. Formabänd. d. menschl. Mol. pag. 403—404). The need for further specialisation makes more or less teeth unite into one "tooth-colony." The origin of the multituberculate tooth is not exactly known, perhaps it contains elements of several tooth-rows, perhaps only of one, but laterally displaced. — Neither is the Osborn nomenclature correct. The anterior lateral cusp of the upper molars is the first to appear, therefore it must be the protocone; the posterior lateral must be the metacone, the anterior lingual the paracone, the posterior lingual the hypocone. In the mandible the four main cusps appear exactly in the order demanded by the Osborn theory; for the fifth typical cusp the name p e n t a c o n i d is proposed, its place is not fixed, it appears sometimes on the anterior border of the tooth (e. g. Marsupialia), sometimes on the posterier (e. g. Primates).

To these challenges O s b o r n replied in "The history and Homologies of the Human molar Cusps" 1892. There is great variance between the palæontological and the embryological evidence in the order of cusp-development. The phylogenetic appearance of the cusps is as follows: I. Protocone and protoconid (Permian), II Para- and metacone, para-, meta- and III hypoconid (Triassic, Jurassic), IV Entoconid (Cretaceous), V Hypocone and hypoconulid (Eocene). The ontogenetic series for the lower teeth is exactly the same, but on the upper teeth the paracone appears before the protocone in Primates and Marsupialia (Röse), in Ungulata both para-

and metacone precede the protocone (Taeker). But the palæontological evidence is so overwhelming that the embryological differences must be supposed to be of a secondary nature. The reference to the Multituberculata is rather unfortunate, since the multituberculate *Neoplagiaulax* (Lower Eocene) must be derived from the paucituberculate *Microlestes* (Upper Triassic), not vice versâ. In *Triconodon* we find in the upper as well as in the lower jaw that of the three cusps the central one is the largest, being evidently the most primitive; in *Spalacotherium* and Amblotheriidæ this large styliform central cusp is seen to be displaced inwards above, outwards below. We are, therefore, entitled to say that the protoconid is the antero-external cusp — as held also by Fleischmann and Röse — and the homologue of that, the protocone, is the antero-internal cusp. Fleischmann starts with the study of a modern tooth (*Dasyurus*) instead of a fossil one; therefore he erroneously asserts that the upper molar contains one element (entomere) more than the lower, whereas exactly the reverse is the case, — that the lower molar contains one element more (talonid) than the upper in the carnivorous forms. Röse and Taeker investigate the ontogeny of a purely Cænozoic type, the quadritubercular molar, and claim by this to see a repetition of a condition of the Cretaceous period, the domination of the protocone. With the development of the crushing bunodont tooth the protocone was depressed to the level of the other cusps. — Röse's term "pentaconid" is referred sometimes to the paraconid, sometimes to the hypoconulid.

Leche publishes in "Studien über die Entwickelung des Zahnsystems bei den Säugetieren" 1892 several embryological tooth-examinations, but gives no real contribution to the question of tooth-phylogeny; he warns against too pretentious statements of tooth-philosophies based only on our recent knowledge of the dental system; it is not even proved that the mammalian tooth has originated from "a conical reptilian tooth." The complication of the teeth is caused not only by their use in masticating food, as some reptiles do so without showing any development of the teeth, but — as

is likewise emphasised in Winge's paper — also by the complicated grinding movements and the specialised mandibular articulation of the mammals. These facts must have characterised even the most primitive true mammals, and hand in hand with their development went the first differentiations of the dental system; therefore the acquiring of grinding teeth — i. e. a heterodont dentition — must have been one of the characters to constitute the mammals. In accordance with that we find no totally homodont form among the mesozoic mammals, and all the recent homodont dentitions are due to reduction. Usually the homodonty is looked upon as constituting one of the attributes of the most primitive mammals; but these hypothetical "ancestral forms" are purely symbolical, being composed of primitive mammalian characteristics only; animals like these have really never existed. „Geschöpfe mit ausschliesslich undifferenzierten Organen werden nur am Schreibtische empfangen und geboren, weshalb sie sich auch noch stets als völlig lebensunfähig erwiesen haben" (pag. 539).

Forsyth Major ("Miocene squirrels", chapter V, 1893) strongly oppeses the Cope-Osborn theory or "dogma", as he calls it. It is evident that Fleischmann's "reversed homologies" of the upper and lower cusps are correct; if the cusp called protocone really is homologous with the reptilian tooth, the protoconid accordingly is to be looked for at the posterior border of the lower tooth, i. e. in the part latest in appearence of this tooth — and that gives the death-blow to the whole theory. — The rodents have been as yet little examined as to the tooth-forms; both Scott and Schlosser however, who have examined extinct rodents, endeavour to derive their teeth from the tritubercular form. But in Sciuromorpha which have preserved the most elementary tooth-forms in this primitive order, evidences are found of another origin, since their molars can be traced back to a polybunous form. „Brachyodonty is the more primitive, the more generalized condition of molar and so is bunodonty . . . ; the more brachyodont a molar is, the more multitubercular it is, or, let us say, polybunous. The

transformation, viz. the reduction and simplification, proceeds from the inner side outwards in superior, and from the outer side inwards in inferior molars. The now prevalent transverse arrangement of cusps or lobes is not the primitive condition, but a specialised pattern of the crown." (pag. 204-205). By a more careful study of the dentition of the Sciuridæ we see that the most primitive, i. e. most brachyodont forms have got the most polybunous teeth (e. g. *Sciurus indicus*), and that the outer parts of the upper and the inner parts of the lower teeth are not only the most constant, but also the most complicated tooth-elements. Hence it follows that the trituberculism is not a primitive, but a secondarily acquired condition, and this is the case in the Ungulata, the Condylarthra, the Creodonta and the Lemuroidea as well as in the Sciuromorpha. Of the numerous original cusps some few are developed which fit in larger grooves or valleys of the opposite tooth, as the so-called "protocone" in the basin of the "talonid" and the "hypoconid" in the "primitive trigone". The more polybunous — i. e. primitive — a tooth is the more distinctly the cusps are arranged in longitudinal rows. This is not only the case with the rodents, but also with the other primitive mammals, among the Carnivora e. g. in the Subursi: „I will only mention incidentally that, in my eyes, amongst recent Carnivora, the Subursi — and, so far as the form of the molars is concerned, *Ailurus* — approach nearest to the primitive carnivorous Mammalia, whilst some of the Arctocyonidæ are the most primitive of Creodonta." (pag. 200). Allotheria which are often pushed aside as an aberrant order, are really not more aberrant than e. g. Myomorpha are. The most essential difference from *Mus* is that in Allotheria the cusps are arranged in longitudinal series, in *Mus* in transverse series, the longitudinal grooves being very shallow. Several of the Cretaceous Allotheria are no doubt „in the direct ancestral line of Eutheria." (pag. 213). — Therefore it may be supposed that the primitive Eutherian molar was polybunous with the cusps arranged in longitudinal series (3 above, 2 below); and through a gradual transformation of this

condition to a transverse one and a constant development of certain cusps with fusion and suppression of others, the different later molar types were formed. Which of the cusps may be homologous with the "reptilian cone" is not known.

The same year an important corrective to the Osborn theory was advanced by Scott ("Evolution of the Premolar Teeth"). He asserts that the evolution of the premolars is not the same as that of the molars. Sometimes even $p\frac{4}{4}$ is found as a single conical tooth, evidently corresponding to the protocone of the molars. But already in the Puerco beds a little protuberance, the deuterocone, appears on the lingual side of p^4, thereafter a third cusp, the tritocone, appears behind the protocone; now the tooth closely resembles the trigonodont molar, but the protocone still occupies its place on the outer side of the tooth. Finally a tetartocone may originate behind the deuterocone so that the tooth becomes quadrituberculate, of the same shape as the quadrituberculate molar, although the cusps are of different origin. p^4 is often fully developed, whereas the foremost premolars still preserve a very primitive shape. — The development of the lower premolars is also different from that of the molars; the protoconid certainly keeps its place on the outer side of the tooth, but no rotation of the para- and metaconid occurs, so that the metaconid becomes an element of the talonid; the tooth finally becomes quinque-tubercular like the molar. The cusps of upper and lower premolars and molars correspond thus with one another:

Upper jaw.

Premolar	*Molar*
Deuterocone	Protocone
Protocone	Paracone
Tritocone	Metacone
Tetartocone	Hypocone

Lower jaw.

Premolar	*Molar*
Protoconid	Protoconid
Paraconid	Paraconid
Deuteroconid	Metaconid
Metaconid	Hypoconid
Tetartoconid	Entoconid

This evolution can be traced through most of the mammalian orders.

The theory advanced by H. W. Marett Tims 1896 ("On the tooth-genesis in the Canidæ") has the following contents: That cusp of the upper carnassial tooth (p^4 and dp^3) of Canidæ which according to the Cope-Osborn theory may be the protocone, is much smaller than the two secondary cusps (para- and metacone); but that is absurd, especially as the small "protocone" evidently is a cingulum-cusp; but the cingulum is a mammalian addition to the reptilian tooth, consequently it can not contain the primitive cusp. And by comparing dp^4 and m^1 one finds that the latter has a well-developed protocone inside the posterior cingulum, but this cusp is wanting on dp^4 which has only three cusps, para- and metacoue and a cingulum-cusp. By comparing such forms as *Canis aureus* and *Cuon rutilans* one finds in the jackal a multitude of accessory cusps which are all lacking in the dhole; the cusp corresponding with the protocone in the former is totally wanting in the latter. The protocone itself being such a variable cusp in closely related forms is a very serious objection to the trituberculism. — If we compare the various species of *Canis*, we see that the more primitive a tooth is, the fewer cusps it has; therefore one may expect often to find more primitive forms in the tricuspid upper teeth than in the lower teeth which are generally quinque-cuspid. — An embryological examination of the succession of tooth-cusp development in the upper jaw of *Canis* affirms the discovery of Röse and Taeker that the paraconid is the first to appear. No trace can be found in nature of the supposed rotation of the para- and metacone. Taking all this together not much is left of the trituberculism. — Some important objections can also be made against Forsyth Major's Polybuny Theory. The cusps are not developed at the same time, as they should be, if they were equivalent; all the Multituberculata have got a dentition so specialised that mammals with a more generalized one can by no means be derived from them; we know non-multituberculate mammals which are much older than the Multituberculata; finally the most primitive forms have fewest cusps on their teeth. — We have to look for the reptilian

cone in the first developed cusp, i. e., the anterior outer cusp above and below — (this is in accordance (!) with Winge's theory in which paracone and protoconid, metacone and hypoconid respectively are homologised) — this cusp may be called the Primary cone. Around this a cingulum early arises (both palæontologically and embryologically), from which various cusps appear, the most constant being the Anterior cingulum-cusp and Posterior cingulum-cusp. On the posterior slope of the primary cone the Secondary cone arises. Finally a Centro-internal cingulum-cusp appears on the inner cingulum. These cusps can not be fully identified with the nomenclature of Osborn, the names of the latter often being applied to different cusps on various teeth; but approximately they correspond with one another in the following manner:

Both jaws. (Tims)	*Upper jaw*	*Lower jaw* (Osborn)
Primary cone	Paracone	Protoconid
Anterior cingulum-cusp	Protocone (partly)	Paraconid (partly)
Posterior cingulum-cusp	Metacone (partly)	Hypoconid (hind part)
Centro-intern. cing.-cusp	Premolars: wanting Molars: Heel (partly)	Premolars: wanting Molars: Metaconid
Secondary cone	Metacone (partly)	Hypoconid (partly)

This Cingulum-cusp Theory is better supported, both palæontologically and embryologically, than are either the Tritubercular or the Multitubercular Theories. The primary reptilian cone is always present; and it is usually easy to find the homology of every tooth-cusp (perhaps except those of the Multituberculata).

In Woodward's examination of the tooth-development of the Insectivora (1896), the problem of the tritubercular type is also discussed. In his opinion the foremost of the three original triconodont cusps has disappeared; the main cone is that which is now called paracone, the hindmost is the metacone, the falsely

called protocone has been developed subsequently „as an internal shelf acting as a mortar for the cusps of the lower teeth“; with the elongation of the teeth the hypocone arose behind it. As regards the further development of the "tritubercular" tooth thus formed, we can accept the Cope-Osborn views. He interprets the teeth of *Centetes* and *Ericulus* usually looked upon as typically trituberculate in another way, maintaining that the main inner cone is not homologous with the protocone, but with the paracone (the "protocone" is wanting, in *Chrysochloris* it is still visible as a little "internal shelf"); the two outer cusps are not para- and metacone, but para- and mesostyle.

H. F. Osborn's "Trituberculy" (1897) is essentially a revision of his earlier theory with appreciation of Scott's modifications with respect to the upper teeth; in opposition to Forsyth Major he endeavours to derive the rodents and probably also the Multituberculates from trituberculate forms.

As an advocate for the Concrescence Theory Fl. Ameghino repeatedly appears, especially in "The primitive Type of Plexodont Molars of Mammalia" 1899. In this paper he provisionally discusses the lower molars only and finds in them as early as in the Cretaceous *Proteodidelphys* all the elements characterising the complete tuberculo-sectorial tooth; this he regards as the starting point for all the different tooth-types, not excluding the simpler ones (except Monotremata, Edentata and Cetacea), which consequently are not primitive, but reduced. The teeth of the Multituberculata have originated through an increase in the number of cusps in the paucituberculate teeth, from which all the other mammalian orders can also be derived. (Ameghino derives most of recent mammalian orders from Cretaceous or Eocene forms found in Argentina). And his "plexodont" ancestral type must have been formed by fusion of several teeth: „Plexodonty presents itself is a primitive character, having made its appearence suddenly; and it is only the theory of fusion which can explain it in a satisfactory manner.“ (pag. 571).

Adloff tries ("Zur Frage nach der Entwickelung der heutigen Säugetier-Zahnformen" 1902) to reconcile the Cope-Osborn Differentiation Theory with the Röse-Kükenthal Concrescence Theory, neither of them being quite satisfactory while both of them contain several good points. „Wenn auch die Thatsachen, die [Kükenthal & Röse] zunächst zur Begründung ihrer Theorie ins Feld führten, zum Theil nicht hinausreichten, zum Theil direct falsch waren, so schien doch damit ein Weg gegeben zu sein, der über manche unwahrscheinliche Stellen der Cope-Osborn'schen Differenzierungshypothese hinweghelfen konnte." (pag. 364). Osborn's diagrammatic stages of transformation are very seductive; but the haplodont stage is quite hypothetical among the mammals and the representatives of the protodont stage are far too few in number to fill the gap between the haplodont and the triconodont stage; Cope's explanation of the mechanical formation of the latter is quite problematic; it may rather be supposed to have originated by fusion of single teeth which by the shortening of the jaws were drawn more closely together. And the transformation of triconodont teeth into tritubercular teeth is very improbable, transitional forms are totally wanting, and the rotation of the protocone is mechanically impossible (Röse). The reason why the outer cusps on both upper and lower teeth are the first to appear in the embryological development is not to be found in the degeneration of the protocone, but in the fact that the cusps belong to different dentitions which have coalesced, the outermost being the oldest. It is only from the tritubercular type onwards that the evolution is certain as indicated by Cope; we know of undisputed examples of the growing-out of new cusps. — Several objections can also be put forth against the Concrescence Theory. No doubt it is matter of fact that embryological fusions of neighbouring teeth of different dentitions do occur, and we may conclude from this that the process — perhaps together with fusion of teeth in the same longitudinal row — has played a part also in the phylogenetic evolution; but it is not legitimate as Kükenthal does to derive all mammalian teeth from the multituberculate teeth. If

anything the tritubercular tooth must be supposed to have originated by concrescence; but the further development has taken place through differentiation and cusp-addition. Certain anomalous circumstances as regards the human teeth tend to show that each of the primary cusps may contain several reptilian teeth.

As far back as 1880 Huxley ("Cranial and dental characters of Canidæ") suggested that the evolution of the complicated molar forms is shown by the successive complication of premolars and molars of *Centetes*, from which type the teeth of Canidæ may be derived. Upon different grounds Schlosser supported a similar theory ("Die Entwickelung der verschiedenen Säugetierzahnformen im Laufe der geol. Perioden", 1891), viz., that in Creodonta, Condylarthra and Ungulata the outer side of both premolars and molars is the more primitive, and the inner side is secondarily complicated. This "Premolar Analogy Theory" is also advocated by Wortman (1902—03) who emphatically asserts that the cusp-evolution in molars is exactly the same as that seen in the premolars, where it can actually be followed step by step from the haplodont into the sexitubercular stage; on this theory the paradox is also withdrawn that the reptilian cones are on the outer side of the premolars and on the inner side of the molars in the upper jaw, and the embryological and palæontological testimonies as to the primary cone are in harmony with one another.

In "Evidence bearing on Tooth-Cusp-Development" 1906 Gidley contests the Cope-Osborn theory and maintains a polyphyletic evolution of the mammalian molars. Osborn has supported his theory chiefly upon the teeth of *Triconodon* and *Dryolestes*; but he has overlooked a very important circumstance. The teeth of *Triconodon* consist of three nearly equal cusps with an outer and an inner cingulum and supported by two roots. *Dryolestes* has in addition to the three cusps noted by Osborn (pr., me., pa.), two others one external cusp (pa) and the other a small intermediate cusp between pr. and me.; there is thus a break between the two genera and the transition is not made easier by the teeth of *Triconodon*

being larger and fewer in number and having a more developed cingulum than those of *Dryolestes.* But the outer portion of the *Dryolestes* molar resembles greatly the whole *Triconodon* molar with its three cusps and two fangs, whereas the inner portion of the *Dryolestes* molar, the "protocone", being supported by a special fang, is very different from the central cusp of the *Triconodon* molar; it seems rather to be a strongly developed heel-like cingulum-cusp. In the contemporary *Dicrocynodon* this heel is still more developed, with two rudimentary fangs. From these facts it may be concluded that the primary (reptilian) cone preserves its original place on the outer side of the upper molar. — The lower molars of *Dryolestes* and (in a lesser degree) of *Paurodon* are typically tuberculo-sectorial; in both of them the pr^d., me^d. and pa^d. seem to have appeared on the very place they now occupy, there is not a trace of rotation. Consequently the pr. and pr^d., pa. and pa^d. etc. can not be really homologous cusps. — In the Upper Cretaceous Laramie forms we find partly the typical "trigonodont" tooth, partly the quadritubercular, but the hypocone seems to be of different origin; sometimes (*Telacodon*) it is clearly a cingulum-cusp, in other cases it is an outgrowth of the protocone (*Pantolambda*) or metacone. — Hence it follows that the tooth-types represented by *Multituberculata*, *Triconodon*, *Dryolestes* and *Dicrocynodon* must have originated independently of one another from the reptilian tooth so that the tritubercular tooth shows only one of the different ways in the development of the mammalian teeth — (certain rodents, e. g. *Palæolagus*, seem to have their tooth-form derived directly from the triconodont tooth) — and even its apparently homologous cusps may have a different origin.

Osborn and Gregory's "Evolution of mammalian Molar Teeth" 1907 is essensially a reedition of Osborn's most important papers; in chapter IX some other theories (of Ameghino, Fleischmann and Mahn, Forsyth Major, M. F. Woodward, Marett Tims, Wortman, Gidley) are summarised and partly refuted; the paper of Winge is alluded to on some few occasions — is

partly misunderstood —, and his theory is not given; evidently it is considered as a "quantité negligéable."

Paul de Terra's "Vergleichende Anatomie des menschlichen Gebisses und der Zähne der Vertebraten" 1911 which gives an impartial review of the theories of Osborn, Kükenthal and Röse a. o,, is here only mentioned because of the immense bibliography of everything appertaining to odontology.

We see in this summary, where moreover only the more important theories are referred to, such a multitude of hypotheses of the phylogeny of the mammalian teeth that we can be tempted with Leche to declare it impossible that any one should be the right one. But which is to be choosen in this "embarras de richesse"?

They can be divided into two main groups: The theories of concrescence and the theories of differentiation or cusp-addition. We will start with the first group. It is supported by Gaudry, Magitot, Dybowski, Kükenthal, Röse, Ameghino, Adloff a. o. and it supposes every complex mammalian molar to be the representative of several reptilian teeth; the more cusps, the more coalesced single teeth. From this it may be concluded that the mammals with the most multicuspid molars are the most primitive; it would be absurd to think that they should first squander a number of reptilian teeth away by the shortening of the jaws and then acquire them again when it became a necessity to have larger teeth. — *Talpa* has 44 teeth and so has *Equus*; but the number of cusps on the horse-teeth is greater than that on the mole-teeth; hence it might follow, if this theory were correct, that the teeth of *Equus* were more generalized than those of *Talpa*, but the reverse is the case. *Sus* and *Phacochoerus* have both $\frac{3}{3}$ molars, but m$\frac{3}{3}$ of *Phacochoerus* has far more cusps than that of *Sus*, though no one would suppose *Sus* to be the more specialised. Several other examples of mistakes in systematic relation could be referred to as the consequences of this theory; it is supported by no palæontological evidence, no fact

suggests that the primitive mammalian teeth really are formed by concrescence. The three cusps of *Triconodon* being equal does not prove that each of them represents a single tooth, nor do the two roots and the undivided basal cingulum point in that direction. Kükenthal's referring to the multituberculate teeth as a fundamental type is equally unfortunate. The Multituberculata are such an aberrant order — with rodent-like incisors (or rather like tweezers), with no canines and with never more than six cheek-teeth — that they can by no means be "in the direct ancestral line" of the several far more generalized recent mammalian orders. It would also be preposterous to suppose that the Mesozoic ancestors of the mammals should have started with very complicated teeth which afterwards were simplified to the condition of the Eocene forms, whose direct descendants have again acquired more and more complicated teeth upto the present time. To suppose the highly complicated form to be the most primitive, the simpler form to be the derivative condition goes against all experience. — The same objections can be made to Forsyth Major's "Polybuny-Theory"; he has made the same mistake in choosing his starting-point in the Rodentia, an order at least as specialised as the Multituberculata and developed partly in analogy with them (a real generic affinity is out of the question). One finds not only among the Sciuridæ, but also among many of the other primitive rodents, teeth which without the least difficulty can be brought into accord with one of the Differentiation Theories; and the aberrant forms of the others due to excessive gnawing activity, can easily be traced back to the typical pattern through intermediate forms. (Vide e. g. Winge: "Jordfundne og nulevende Gnavere"; E Museo Lundii I 1888).

The palæontology having failed we must search for evidence of the Concrescence Theory in the ontogeny. Kükenthal has discovered that in the embryos of Mystacoceti some of the teeth (though not all and not always the same) are separated into two or three papillæ and hence he concludes that the mammalian teeth have originated through a fusion of several separate germs. It

may be doubted if this conclusion is allowable; at any rate the teeth of the whale-bone whales are so extremely rudimentary and with so many individual variations that no sure conclusions can rest upon them. The same is the case with the far less reduced dentitions of Odontoceti, Edentata and even of *Myrmecobius*, *Otocyon*, *Proteles*, Pinnipedia etc.

Can the normal dentitions support the Concrescence Theory better? Röse and others have shown that the more complicated teeth also germinate with one isolated tooth-papilla corresponding to each future main cusp, only after a while the papillæ coalesce, and from this ontogenetic development he concludes to the phylogenetic evolution. Certainly the "biogenetisches Grundgesetz" has been a good deal idolized, especially in Haeckel's country; in its broad features it can no doubt be said to hold good, but entering into details one finds so many exceptions that one can hardly speak of a rule, still less of a fundamental law; one has always to be cautious in speaking of the ontogeny recapitulating the phylogeny. But if this "law" were really applicable to the mammalian teeth, were Röse's conclusions legitimate? The starting-point of the tooth-formation is certainly the enamel-organ, formed by an outgrowth from the dental lamina — the tooth having thus preserved its primeval nature as a tegumentary structure. No doubt there is always one and but one enamel-organ for every tooth (even in *Manis* Röse himself has found it). It is only when this organ has reached a certain point of development that mesodermal tooth-papillæ are formed in connection with it, one papilla for every future main cusp. Therefore the enamel organ must be considered as the primary factor and the tooth-papillæ as the secondary factor in tooth-development; the primary element being single, not too much stress can be laid on the secondary being divided. To my mind the embryological development is only suggestive of every tooth being a single organ. — When Röse and others endeavour to homologise the anterior outer cusp of upper molars (paracone) with the lower protoconid on account of its early appearance, this con-

clusion is hardly more legitimate. The hypothetical "reptilian cone" can not always be obliged to appear first, if one of the other cusps in the process of development grows larger; it may even be allowed to disappear if it has become functionless. It is most probable that the cusp which on the adult tooth is meant to be the most vigorous may also appear as the first, in order to get the necessary start; Woodward's demonstration of the succession of tooth-cusps of various Insectivora (l. c. 1896) seems to me to confirm this view.

We thus adopt none of the Concrescence Theories; but what about the Differentiation Theories? Let us start with the latest one. Gidley's statement of the construction of the *Dryolestes* molar seems very good; but his assertion that the hypocone should be of different origin in the various tooth-types surely needs further affirmation. With the exception of the Multituberculata the origin of the teeth of all mammals is undoubtedly monophyletic; the teeth of the most primitive tertiary and recent forms are all of the same fundamental pattern, though it may be somewhat veiled (Edentata, Cetacea). At any rate the rodents do not differ from the remaining mammals. Consequently there is no reason for searching after derivatives of the *Triconodon*, *Dryolestes* and *Dicrocynodon* molars in different recent orders.

Tims's Cingulum-Cusp Theory is essentially based on the conditions present in the various species of *Canis*; but for one thing this material is much too scarce, and again the teeth of Canidæ are too specialised to indicate the evolution of the mammalian molar. Moreover Tims has not been aware of the difference between the constant cusps and the variable cusplets which may individually appear or disappear; for which reason he indicates sometimes a cingulum-cusp, at others an accessory cusplet, and at still other times the real protocone by the term protocone. His remarking that the more cusps a tooth has, the less primitive it is, is essentially correct; but in concluding from this that the 3-cuspid upper molars must be more primitive than the 5-cuspid lower molars he overlooks the fact that a tooth can also lose its

cusps by reduction, and this may be the case — as is shortly to be shown — with the carnassial itself of the Carnivora. The whole foundation of Tims' theory is a mistake and consequently the theory itself is a failure also.

Fleischmann's hypothesis that upper and lower teeth are homologous in reversed position, is a very peculiar one. According to Owen's definition (in "Lectures on the Comp. Anat. a. Physiol. of the Invertebrate Anim., delivered at the Roy. Coll. of Surg. 1843") the term "homologous" is used for "the same organ in different animals under every variety of form and function." There are different kinds of homology. The fore and hind limbs — or the different vertebræ of the backbone — are serially homologous, although they are developed in different directions. The limbs of the right and the left side are symmetrically homologous ("homotypy"). The fore limbs of e. g. man, whale and bird are also homologous ("incomplete homology"), being functional differentiations of organs of similar origin. On the other hand the wings of birds and insects are merely analogous: organs of different origin, but of the same function. — The upper teeth are serially homologous. If it can be demonstrated that they have the same origin, then the anterior and posterior portion of one tooth is correspondingly homologous with that of the other. The same is the case with the various parts of the lower teeth. The upper and lower teeth are no doubt homologous quâ teeth, but of their single parts only those cusps may be called homologous which one can demonstrate to be identical with the reptilian cone itself. All the remaining cusps are analogous parts, formed by reciprocal action between the opposing teeth in the two jaws. When Fleischmann asserts that the anterior portion of the upper molar is homologous with the posterior portion of the lower molar etc., it is surely a misunderstanding of the term "homologous". If such were the case, it necessitates the original position of the lower teeth in the upper jaw and a subsequent removal and a reversed position in the lower jaw — which is absurd. — A careful comparison of the various mammalian

teeth shows us also that his "stereometric forms" are rather artificial.

The Cope-Osborn-Scott-theory is the most commonly adopted one, and it seems also to be proved by much palæontological evidence. But if more carefully examined it presents some weak points. Its most important point is the identification of the reptilian cone which is supposed to have rotated inwards above, outwards below. Against this assertion most of the attacks are directed, especially from the various embryogenetic theories; but Osborn repels them all by referring to such palæontological series as *Triconodon-Dryolestes*, *Peralestes*, *Kurtodon* or others, where the reptilian cone is first seen as the median one of the three cusps and is finally rotated. But Osborn has still to give us irrefutable proof, 1⁰ of the *Triconodon*-like forms being the ancestors of *Dryolestes* etc., 2⁰ of the supposed protocone and protoconid of these mammals really being homologous with the median cusp of *Triconodon*. One can hardly imagine how such a rotation could take place; and if Gidley is right in his interpretation of the molar-cusps of *Dryolestes*, the rotation has not taken place, but the so-called protocone is a secondary acquirement, the true protocone is still to be sought in the central one of the three outer cusps. If this holds good the whole nomenclature and theory of Osborn falls to the ground; neither protocone nor protoconid are then identical with the reptilian cone. Certainly the anterior and posterior cusps of the lower molars of *Spalacotherium*, *Tinodon*, *Menacodon* etc. have grown a little inwards, but that these very forms should be the origin of the later tritubercular molar-type is not at all proved. The para-, meso- and metastyle are considered as unimportant accessory cusps by Osborn; therefore he will have difficulty in explaining their occurrence in usually the most primitive forms among widely divergent orders. — For the rest Osborn's identification of the same cusp of different mammalian molars is sometimes very doubtful. The teeth of the insectivores cause difficulties just because the three outer cusps are considered as of secondary nature.

The so-called protocone of the horse-molar is really but a cingulum-cusp which is about to arise in *Anchitherium*, is high but still isolated in *Hipparion* and united by a narrow bridge with the true protocone (falsely called protoconulus) in *Equus*. — Scott's modification for the case of the premolars is no improvement; he considers every premolar with few cusps as primitive and in searching for premolars with successively increasing number of cusps he thinks he finds the succession of the premolar cusps. But at all events $p\frac{3}{3}$ and $p\frac{4}{4}$ are molariform in primitive forms of Didelphyidæ and Insectivora (the circumstances of $p\frac{1}{1}$ and $p\frac{2}{2}$ are more doubtful). A hind premolar with few cuspsi s in reduction, and Scott's progressive series shows rather the succession in which the cusps disappear. — Similar objections may be made against the premolar analogy theories.

Baume's theory can be treated in a few words, Rost's thorough criticisms already having been mentioned, I need only refer the reader to the consequences in systematic relation drawn by Baume himself. Vestigia terrent.

Thus we have only left Winge's differentiation theory from 1882, „welche" — using Leche's words (l. c. pag. 539) — „unbedingt einen der gediegnesten neueren Beiträge zur Morphologie des Gebisses bildet." To my mind it has all the advantages of Osborn's theory — being plain, logical, practicable, in accordance with the mechanical-biological principles and with the palæontological evidence — without having its defects: It presupposes no doubtful rotation of any cusp, it allows an easy and precise homologising of the main cusps of any tooth and thus gives important information about the history of the various mammalian orders (vide Winge: E Museo Lundii I-III, 1888—1906); it deserved therefore a far greater appreciation than it has received. — The objection has been made against it, that it presupposes the reptilian cone to be one of the earliest disappearing cusps of the upper molars; but however early the origin of a cusp may be, from the time that its position causes a loss of function it must atrophy and finally disappear. And the more the grinding surface of the teeth is

enlarged (especially in herbivorous animals), the more the three outer cusps of upper molars constituting the original cutting edge are pushed aside. — Further it has been considered as a disadvantage that the cusps are indicated by numerals and not by names; but the numerals have the advantage of being purely topographical without implying any statement of the theoretical cusp-phylogeny, so that they may be used even by those who do not adopt Winge's views. A nomenclature satisfying those claims would readily become too long and inconvenient.[1]) — For the sake of convenience I give a parallel between Osborn's names in their ordinary application and Winge's indications:

Upper jaw

Osborn	*Winge*
Protocone	6
Paracone	4
Metacone	5
Hypocone	7
Parastyle	1
Mesostyle	2
Metastyle	3

Lower jaw

Osborn	*Winge*
Protoconid	4
Paraconid	1
Metaconid	2
Hypoconid	5
Entoconid	3
Hypoconulid	(Accessory cusp).

In the present paper Winge's terms will be used.

Construction of upper carnassial tooth.

In three different orders of the mammals we meet with that development of one or more upper cheek-teeth which we indicate as Carnassial (carnassière, Raub- or Reisszahn): in Marsupialia polyprotodonta (*Sarcophilus*, *Thylacinus*), Creodonta (Carnivora primitiva Winge), especially *Pterodon* and *Hyænodon*, and Carnivora

[1]) If a nomenclature were demanded, I would propose the term *mastos* (*Μαστος*) for a cusp — conus and cuspis being anticipated by others —, the outer row being named *ectomasts (anterior, median* and *posterior e.),* the middle row *mesomasts* (*anterior* and *posterior* m.), the inner row *entomasts (anterior* and *posterior e.).* The cusps of the lower teeth might be distinguished as *-mastid (ekto-* and *entomastid)* — or, corresponding to the numerals, *proto-*, *deutero-*, *trito-*, *tetarto- ... mast(id).*

(C. vera Winge). With respect to fossil forms it may often be doubtful which of these three orders they must be referred to, on which account it would be of special interest if one could find characteristic distinctive features in the teeth of either of them.

The upper carnassial type is well known: The outer cutting edge (blade) formed by two longitudinal crests, (the anterior one generally with a high pointed cusp and separated from the posterior more horizontal one by a notch), is supported by two roots; in front of the anterior cusp are generally one or a couple of small cusps, and on its inner side is in most cases placed a more or less heel-like tubercle supported by a special root. According to Osborn's nomenclature they are generally named pr., pa., me. and ps.

The cusp-homologies of the carnassial of *Sarcophilus ursinus* (m^2) are not difficult to understand when compared with m^1 and this tooth again with the molars of *Dasyurus*. (Fig. 1, vide also the diagrams on pag. 108). In the latter genus we find in the upper molars the exterior edge composed of three small cusps (1-2-3 of Winge); inside them, and connected with them by crests, are two high cusps, 4 and 5, inside them again one, 6. (Diagram 1). The same six cusps are very easily recognised in m^1 of *Sarcophilus*, where 5 is greatly enlarged and about to engulf 2 and 3, whereas 4 is small and on the same level as 1. The catastrophe has fallen on m^2: 2 has been totally swallowed up by 5, and 3 appears to be a mere appendix to its hind end, 1 and 4 are placed beside one another as two equal cusps. (diagr. 2). The characteristic is the equivalence of 1 and 4 and the predominance of 5. With *Thylacinus* the same is the case, but the single stages in development are more veiled because of the sharper character of the tooth (diagr. 3).



Fig. 1. *Sarcophilus ursinus.* m^1 and m^2.

In Carnivora primitiva we find generally both m^1 and m^2

developed as carnassials. Their construction is essentially the same in *Hyænodon*, *Pterodon* and the still more primitive forms *Cynohyænodon*, *Deltatherium* etc. (Fig. 2, diagr. 4 and 5). The outer edge is in *Pterodon* curved with the concave side outwards and divided into four cusps of unequal size: the foremost of them is small and low (1), obliquely behind and inside it are two nearly

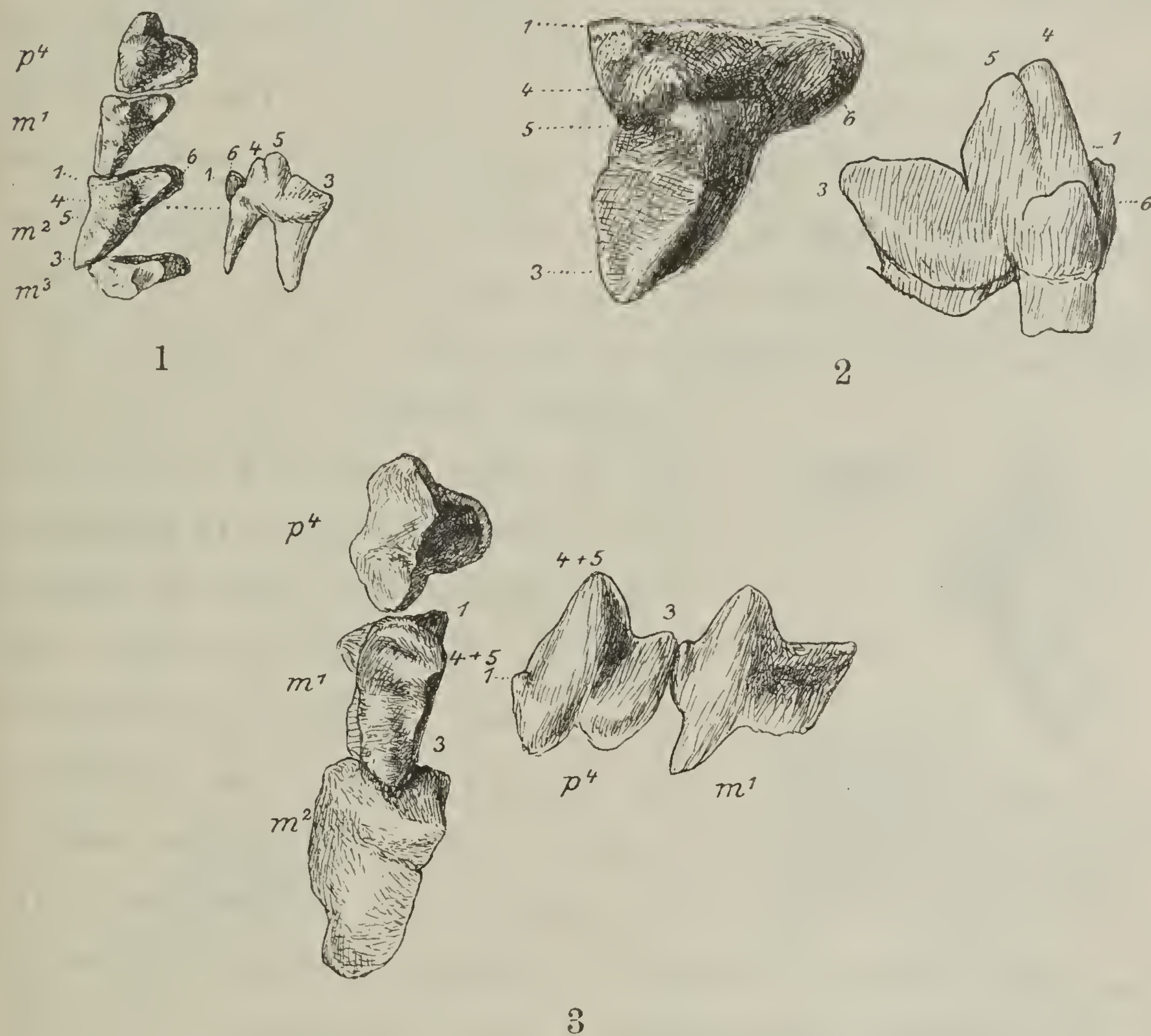


Fig. 2. 1. *Cynohyænodon cayluxi*, p^4-m^3. (m^2 represented from the outer side). — 2. *Pterodon dasyuroides*, m^1 (from above and from the inner side). — 3. *Hyænodon brachyrhynchus*, p^4-m^2, (m^1-m^2 from above and from the outer side).

equal cusps, the one behind the other (4 and 5), and obliquely outwards behind the hindmost is a low, lengthened cusp with sharp edge (3). Inside the two main middle cusps the ordinary heel (6) is placed. It is evident from the diagram (diagr. 4) that the middle outer one (2) of the six cusps found in *Dasyurus* is wanting — if it has totally disappeared or, as in *Sarcophilus*, has joined the

cusp 5, is difficult to say for certain, the former alternative may be the most probable. We meet thus with an example of the vanishing of the “reptilian cone”. — In *Hyænodon* the construction is almost the same, except that 6 has almost disappeared, 1 is very small and 4 and 5 have united into one sharp narrow cusp. The characteristic of the carnassial of Carnivora primitiva is the equivalence of 4 and 5, the small size of 1 and the length of 3.

In Carnivora vera we must look at the milk-carnassial (dp^3) and the permanent carnassial (p^4) separately. The most obvious difference between them is that cusp 6 with its root is placed nearly in the middle of the inner side of dp^3, whereas it is placed on or near the anterior end of p^4; this fact is due to an important difference in the construction of the teeth. If we examine dp^3 of a primitive carnivore, e. g. *Viverra civetta* (fig. 3, diagr. 6), we find at the anterior end a rather large cusp (1) separated by a long shallow notch from the high median cusp (5); inside the notch a small rounded cusp is placed, connected with the anterior border of the heel (6), the posterior border is joining the main median cusp. The hindmost cusp (3) is long and rather low. Cusp 2 is evidently wanting, and the small cusp inside the notch between 1 and 5 must be 4. This cusp 4 is very varying in size in *Felis spp.* and *Hyæna spp.*, but rarely longer than 1 and always placed somewhat inside this cusp, sometimes just in front of the anterior sharp edge of 5, thus

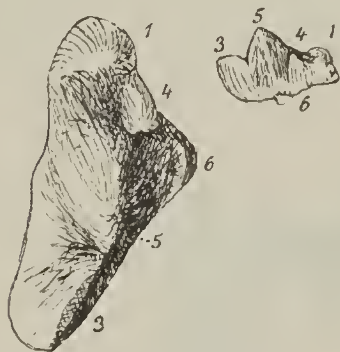


Fig. 3. *Viverra civetta*, dp^3. (Viewed from above, $^3/_1$, and from the inner side, $^1/_1$).

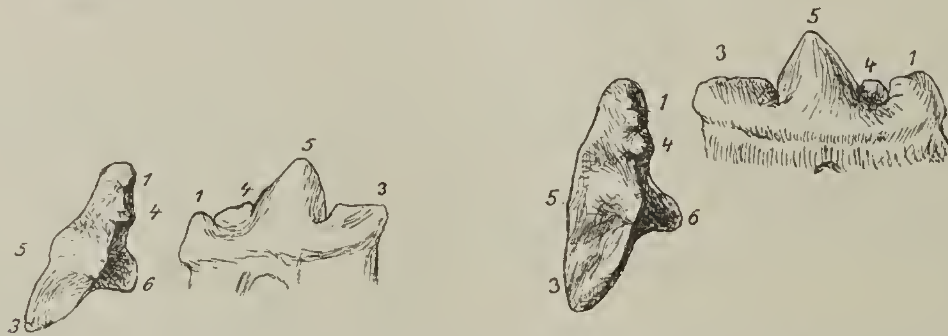


Fig. 4. 1 *Felis pardus*, 2 *F. onça*, dp^3 (from above and from the outer side). $^1/_1$

affirming its nature as the true 4 (fig. 4 and 5). In *Canis* (fig. 6 and diagr. 7) it also occupies the last mentioned place, but is much smaller than 1 and distinctly separated from it, whereas it nearly has coalesced with 5. This condition is still more advanced in

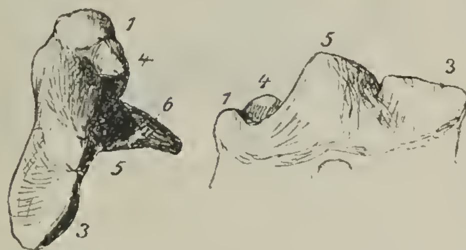


Fig. 5. *Hyæna crocuta.*
dp³ (from above and from the outer side). ¹/₁.

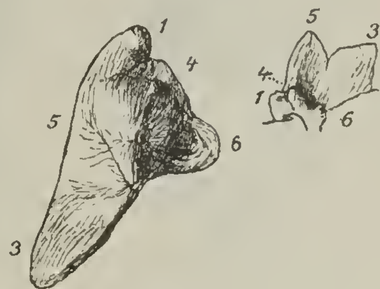


Fig. 6. *Canis vulpes.*
dp³ (from above and from the inner side). ⁵/₂ and ¹/₁.

Bassaris (fig. 7) where 4 has nearly lost its individuality, though 1 is still large. — 6 being connected with 4, not with 1, it is evident that 1 being large and 4 small the anterior part of the tooth must reach some distance in front of 6, so that the heel is found in its characteristic place. — Characteristic of dp³ is the relatively large 1 and the rudimentary, sometimes vanishing 4.



Fig. 7. *Bassaris astuta.*
dp³ (from above and from the outer side). ³/₁ and ¹/₁.



Fig. 8. *Genetta tigrina.*
p⁴ (from above and from the outer side). ³/₂ and ¹/₁.

p⁴ of a Viverroid e. g. *Genetta* (fig. 8, diagr. 8), differs from dp³ in cusp 1 being as it were pushed into the anterior outer corner, whereas 4 has increased; 5, 6 and 3 are also relatively stronger than in dp⁴. In *Felis* (fig. 9, diagr. 9) cusp 4 has grown into a very important cusp, sometimes with a rudimentary cingulum-like shelf on its anterior border, evidently the remnants of 1. In *Machærodus* (fig. 10) 1 is a little more distinct, but very insignificant.

In *Hyæna* (especially *H. striata* fig. 11, diagr. 10) 4 nearly

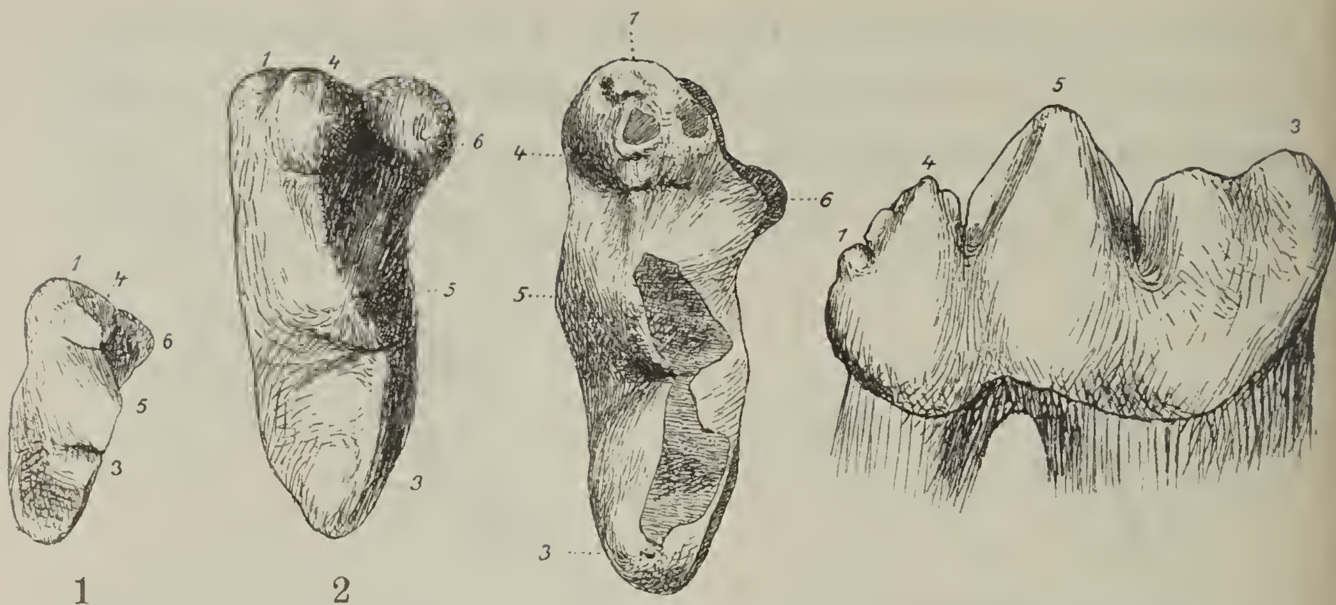


Fig. 9. 1. *Felis pardus.* 2. *F. leo.* p⁴ from above. ¹/₁.

Fig. 10. *Machærodus neogæus.* p⁴ (from above and from the outer side). ¹/₁.

equals 5 and 3, whereas 1 resembles a little wart. — In all the genera mentioned, cusp 6 rises some distance behind the anterior end of the tooth and is connected by a more or less obvious list or ridge with 4; this list may individually become divided into one or more cusplets. The same is the case with *Canis* (diagr. 11), but here 4 is quite small and 1 has totally disappeared, consequently 6 is placed just inside the front border of the tooth. — Characteristic for p^4 is thus the rudimentary condition of 1 and the often strong development of 4 — just the reverse condition of that found in dp^3 — ; consequently 6 appears as it were displaced against the front end of the tooth.



Fig. 11. *Hyæna striata.* p⁴ and m¹. ¹/₁.

In Procyonidæ (together with Melini, cfr. Winge: Jordfundne og nulevende Rovdyr, E Mus. Lundii II 2, 1896) p^4 acquires one element more, a cusp 7 arising behind 6, but being supported by the same root. (fig. 12, diagr. 13). The successive evolutional stages are clearly shown in the series *Bassaris-Procyon-Ælurus.* It corresponds to Osborn's hypocone and gives the tooth a bunodont character. — In the strange genus *Æluropus*

(fig. 13, diagr. 14) the heel of p^4 is likewise bicuspid, and this is one of the reasons for the assertion of Lydekker and Lankaster ("On the Affinities of *Æluropus melan.*", Trans. Linn. Soc. 1901) that it is more nearly related to *Ælurus* than to *Ursus*. From a cursory glance at p^4 of *Æluropus* it seems also very much like that o *Ælurus*, but a more careful examination shows an important difference. I am very much indebted to Mr. Oldfield Thomas for allowing me during a visit to the British Museum to detach p^4 of *Ælurus* and *Æluropus* in order to compare them. In the normal condition cusp 6 is supported by a special root which is expanded to support the anterior part of cusp 7 as well, when this is present, whereas its posterior part rests on a part of the root of 3 or 5; this condition is seen in all bunodont mammals. The same is the case with *Ælurus* (fig. 12), and here the root under 6 and 7 is very strong; but *Æluropus* (fig. 13) shows the strange condition of the heel-root supporting, not the anterior heel-cusp which is supported by the anterior outer root (r_{4-5}), but the main part of the posterior heel-cusp,

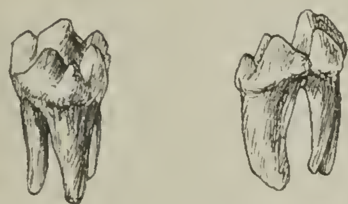


Fig. 12. *Ælurus fulgens.* p^4 isolated, from the inner and the front side. Note the strong root supporting cusps 6 and 7. $^1/_1$.

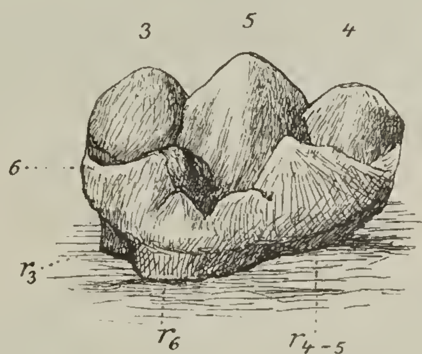




Fig. 13. *Æluropus melanoleucus.* p^4 in situ and isolated, from the inner and the front side. Note the weak root supporting cusp 6 (r_6), and the two strong outer roots (r_{4-5} and r_3). $^1/_1$.

the root itself being relatively weak. Hence we may conclude that this posterior heel-cusp is the true cusp 6, the anterior one being only a strongly developed cingulum-cusp on the ridge passing from 6 to 5, as Winge also supposed in 1886 (l. c. pag. 62) without knowing the position of the roots. All the cheek-teeth of *Æluropus* show a great tendency to form secondary cusplets. — Thus in this genus cusp 7 of p^4 is wanting, the heel being unicuspid and placed far back. In this respect it resembles p^4 of *Ursus*, whose cusp 6 is also displaced backwards and is small, its root often being united with the root of 5; 4 is wanting, and the tooth is in a rather rudimentary condition (fig. 14, diagr. 15). This is perhaps the reason why a cingulum-cusp, is not developed. Thus both tooth-form and tooth-formula affirm Winge's view, that *Æluropus* is an aberrant member of the Ursidæ, not of the Procyonidæ.



Fig. 14. *Ursus arctos.* p^4 isolated, from the inner side. Note the position of 6 and its feeble root united with the root of 3 (r_{3+6}), 4 is wanting. $^1/_1$.

The other resemblances between *Æluropus* and *Ælurus* set forth by Lankaster and Lydekker seem to me to be mostly analogous features due to the adaptation to the same habits.

It is not my intention to go through all the different modifications of p^4 of the Carnivora; but I hope that, from the views set forth here, it will be easy to homologise the single cusps in the teeth of the various families of that order; Mustelidæ are not the least instructive forms, for they show the transformations very clearly from the exclusive carnivorous to the herbivorous diet.

We have here met with four different forms of the upper carnassial, which differences are essentially limited to the development of cusp 1 and 4: in Marsupialia (1 and 4 equal), in Carnivora primitiva (4 and 5 equal, 1 small), in Carnivora vera, milk-carnassial (1 larger than 4 which may coalesce with the base of 5) and in Carnivora vera, permanent carnassial (4 larger than 1 which

may, on the other hand, coalesce with the base of 4). Hence it may be seen that the same tooth-form may be produced in different ways; if one who had not studied the history of the cusps, placed the carnassial of *Canis*, *Thylacinus* and *Hyænodon* beside one another, he certainly would suppose the single cusps to be homologous with one another, which is not the case.

I imagine — although I have not been able to examine sufficient material — that from the facts pointed out here, it will be possible to settle the question of the classification of several of the carnivorous mammals whose position is still dubious. Thus *Palæonictis* (fig. 15, diagr. 12), which is often placed among the

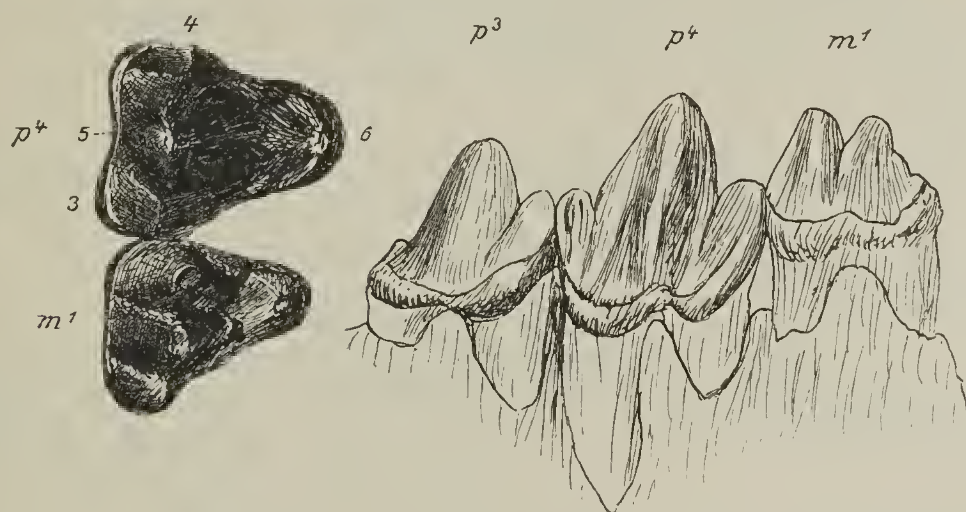
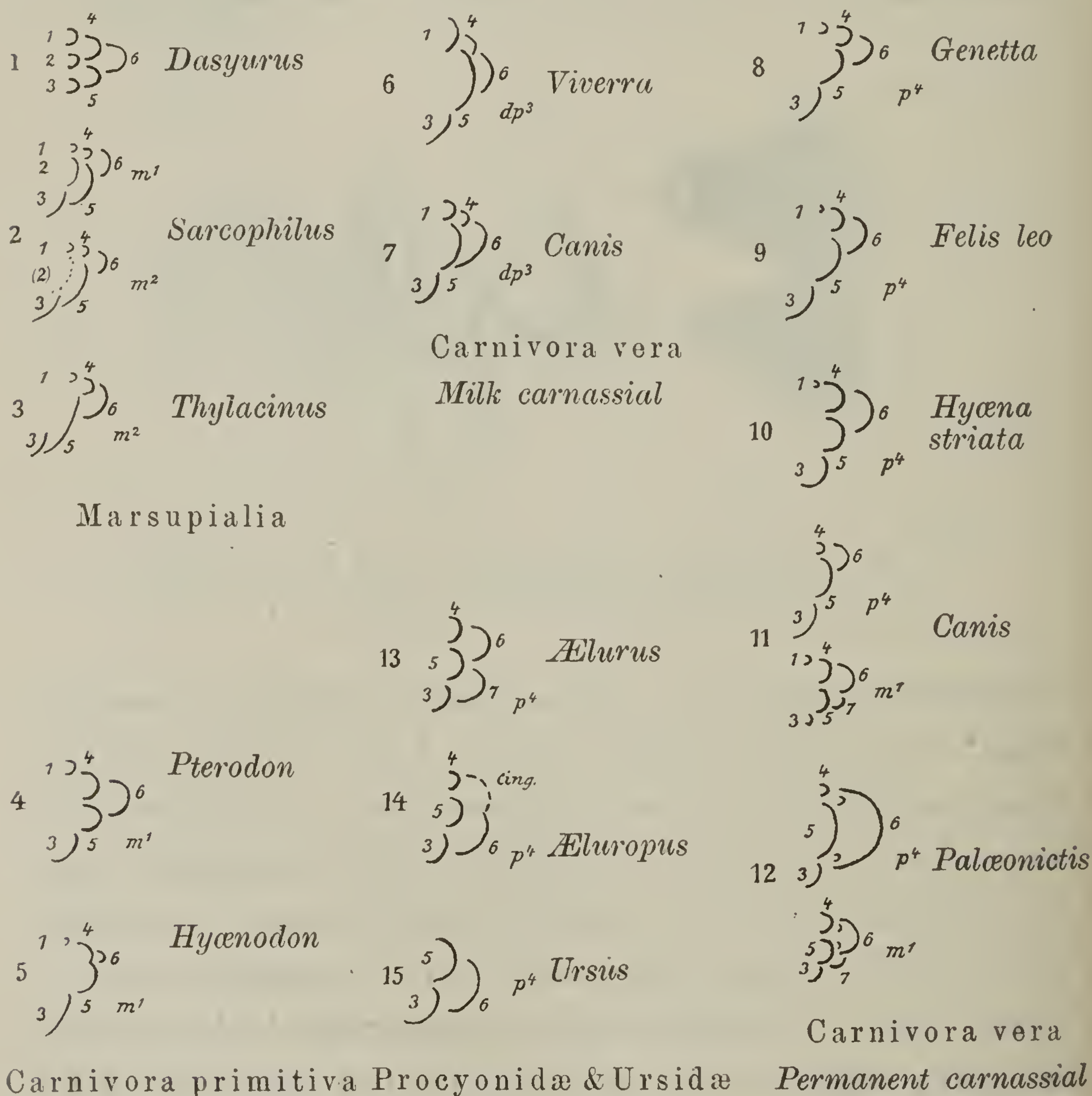


Fig. 15. *Palæonictis occidentalis.* p^4 and m^1 from above, p^{3-4} and m^1 from the outer side. $^1/_1$.

"Creodonts", appears as a representative of Carnivora vera (cfr. Winge, l. c. pag. 52). Not only is p^4 the carnassial, but it is formed as that of the true carnivores, cusp 1 is wanting, 4 is independent. No doubt m^1 resembles the creodont carnassial, 4 and 5 being equal; the main difference is after all that 1 is wanting and 3 is very low and short; but the whole character of the tooth is more that of a crushing than of a cutting agent, though not in as high a degree as that of m^1 of the true carnivores. But it forms the connection between this and the creodont carnassial and shows that not the recent carnassial (p^4), but the recent tubercular tooth (m^1 and m^2) is derived from the creodont carnassial (m^1,

m^2 or m^3) by the suppression of 1 and 3 (sometimes present as a mere rudiment) and the depression of 4 and 5 to the same level as 6.

dp^3 has perhaps preserved a primitive character in the fact that 4 is more nearly connected with 5 than with 1, as it is also in the creodont teeth; but there is no genetic relation between them, dp^3 belonging to another tooth-generation which on the whole has kept many primitive features. But this and some other closely related questions I hope to elucidate in a paper under preparation concerning the milk-teeth of the Carnivora.



Diagrams. (Partly after Winge).

Bibliography.

(An asterisk indicates that I have not seen the paper in question).

P. Adloff: Zur Frage nach der Entstehung der heutigen Säugetierzahnformen. (Zeitschr. f. Morphol. u. Anthropol. Bd. 5, 1903).

Fl. Ameghino: *Filogenia. 1884.

" *Sur l'Évolution des Dents des Mammifères, (Bol. Acad. Nac. d. Cienc. T. XIV, 1896).

" On the primitive Type of the Plexodont Molars of Mammals. (Proc. Zool. Soc. Lond. 1899).

Rob. Baume: Odontologische Forschungen I. (Leipz. 1882).

E. D. Cope: On the Homologies and Origin of the Types of Molar Teeth of Mammalia Educabilia. (Journ. Acad. Nat. Sc. Philad. vol. VIII, 1874).

" The Method of Creation of Organic Forms. (Proc. Amer. Philos. Soc. Philadelphia vol. XII, 1871—72).

" Note on the Trituberculate Type of Superior Molar and the Origin of the Quadrituberculate. (Amer. Naturalist XVII, 1883).

" Vertebrata of the Tertiary Formations of the West. (Rep. U. S. Geol. Surv. Territ. vol. III, 1884).

" The mechanical Causes of the Development of hard Parts of the Mammalia III. (Journ. Morphol. vol. III, 1889).

G. Cuvier: Recherches sur les ossemens fossiles. 1837.

F. Cuvier: *Des dents des Mammifères considerées comme charactères zoologiques. 1822—25.

B. Dybowski: Studien über Säugetierzähne. (Verh. d. k. k. zool. bot. Gesellsch. in Wien. Bd. 39, 1889).

A. Fleischmann: Die Grundform der Backenzähne bei Säugetieren und die Homologie der einzelnen Höcker. (Sitzungsber. d. kgl. Pr. Acad. d. Wissensch. zu Berlin. Halbbd. II, 1891).

W. H. Flower & R. Lydekker: An introduction to the study of Mammals, living and extinct. 1891.

A. Gaudry: Les enchaînements du monde animal. Mammifères tertiaires. 1878.

J. W. Gidley: Evidence bearing on Tooth-Cusp-Development. (Proc. Washingt. Acad. Sc. vol. VIII, 1906).

C. G. Giebel: Odontographie. 1855.

Th. H. Huxley: On the cranial and dental characters of the Canidæ. (Proc. Zool. Soc. Lond. 1880).

W. Kükenthal: Ueber den Ursprung und die Entwickelung der Säugetierzähne. (Jen. Zeitschr. f. Naturw. Bd. 26, 1892).

" Ueber die Entstehung u. Entwickelung des Säugetierstammes. (Biol. Centralbl. Bd. 12. 1892).

E. R. Lankaster & R. Lydekker: On the affinities of Æluropus melanoleucus. (Trans. Linn. Soc. Lond. 2 ser. VIII, 1901).

F. Lataste: Étude de la dent canine, appliquée au cas présenté par le genre Daman etc. (Zool. Anz., Jahrg. 10, 1887).

W. Leche: Studien über die Entwickelung des Zahnsystems bei den Säugetieren. (Morphol. Jahrb., Bd. 19, 1882).

E. Magitot: Des lois de le dentition. (Journ. de l'Anat. et de la Physiol., par Robin & Pouchet. Tome 29, 1883).

C. J. Forsyth Major: On some miocene squirrels, with remarks on the Dentition and Classification of the Sciurinæ. (Pr. Z. S. London 1893).

H. F. Osborn: The evolution of mammalian molars to and from the tritubercular type. (Amer. Naturalist. XXII. 1888).
" The history and homologies of the human molar cusps. (Anat. Anz. VII, 1892).
" Trituberculy. (Amer. Naturalist. XXXI, 1897).

H. F. Osborn & W. K. Gregory: Evolution of mammalian molar teeth. 1907.

R. Owen: Lectures on the comparative anatomy aud physiology of the invertebrate annimals, delivered at the Royal College of Surgeons. 1843.
" Odontography, 1840—45.

H. Rost: Versuch einer Phylogenie des Säugetiergebisses. (Inauguraldissertation. Jena 1883).

C. Röse: Zur Phylogenie des Säugetiergebisses. (Biol. Centralbl., Bd. 12, 1892).
" Ueber die Entstehung und Formabänderungen der menschlichen Molaren. (Anat. Anz. Jahrg. 7. 1892).
" Ueber rudimentäre Zahnanlagen der Gattung Manis (ibid.).
" Ueber die Zahnentwickelung der Beuteltiere (ibid.).

J. A. Ryder: On the mechanical genesis of tooth-forms. (Proceed. Acad. Nat. Sc. Philad. 1878).

W. B. Scott: The evolution of the premolar teeth in the Mammals. (Proceed. Acad. Nat. Sc. Philad. 1892—93).

M. Schlosser: Die Differenzierung des Säugetiergebisses. (Biol. Centralbl. Bd. X, 1890—91).
" *Die Entwickelung der verschiedenen Säugetierzahnformen im Laufe der geologischen Perioden. (Verh. d. odontol. Gesellsch. Bd. 3, 1891).

P. de Terra: Vergleichende Anatomie des menschlichen Gebisses und der Zähne der Vertebraten. Jena 1911.

Oldfield Thomas: On the homologies and succession of the teeth in the Dasyuridæ etc. (Philos. Trans. Roy. Soc. 1887).

H. W. Marett Tims: On the tooth-genesis in the Canidæ. (Journ. Linn. Soc., zoology. Vol. 25, 1896).

M. Weber: Die Säugetiere. Jena 1904.

H. Winge: Om Pattedyrenes Tandskifte, især med Hensyn til Tændernes Former. (Vidensk. Medd. Naturh. Foren. København. 1882).

» E Museo Lundii I—III. København, 1888—1906.

J. L. Wortman: Studies of Eocene Mammalia in the Marsh Collection. (Amer. Jour. Sci. vol. XIV and XVI, 1902—03).

M. F. Woodward: Contributions to the study of mammalian dentition. I. and II. (Proc. Zool. Soc. Lond. 1893 and 1896).

15.—2.—1913.

Homoeotisk Regeneration af Antennen hos en Phasmide, *Carausius (Dixippus) morosus.*

Af

Stud. vet. ***H. O. Schmit-Jensen.***

I. Oversigt over Tilfælde af Homoeosis hos Insekter.

Navnet Homoeosis indførtes i Biologien i 1894 af W. Bateson (1), som i sin store Materialsamling til Studiet af Variationsfænomenerne benytter det som Betegnelse for en lille Gruppe af Tilfælde af meristisk Variation, i hvilke et Led af en meristisk Række optræder med Former eller Karakterer, som er karakteristiske for andre Led i samme Række. Bateson samler de Tilfælde af Homoeosis hos Arthropoder, som han har kunnet opspore, i et særligt Kapitel af sit Værk. De 4 Tilfælde hos Insekter, som anføres heri, skal af rent historiske Hensyn nævnes udførligt allerede her.

1. G. Kraatz (2) beskrev og afbildede i 1876 et Eksemplar af *Cimbex axillaris*, som paa Spidsen af venstre Antenne bar et klobærende Tarseled med to veludviklede, normale Kløer med en tydelig Plantula imellem sig. Antennen var iøvrigt normal lige ud til det Sted, hvor det kølleformede Led normalt skulde have siddet, dog var den i det hele taget lidt mindre og tyndere end højre, normale Antenne. Bateson har haft Dyret til Undersøgelse, men har intet at føje til Kraatz's Beskrivelse.

2. Kriechbaumer (3) fangede 1889 i München et Eksemplar af *Bombus variabilis* Schmkn. ♂, der viste sig at have venstre Antenne delvis udviklet som en Tarse. De to første Led af An-

tennen var normale, de følgende misdannede. Fra Apex af 2. misdannede Led skød der sig et forkortet, fortil rødbrunt og skinnende Kloled frem med to ganske regelmæssige Kløer, saaledes som de normalt findes paa Tarserne.

Endvidere meddeler Bateson følgende to Tilfælde, idet han dog bemærker, at Ægtheden af det første, indtil nærmere Beskrivelse foreligger, maa drages i Tvivl, og at det andet maaske slet ikke er af homoeotisk Natur.

3. Saage (4) modtog i 1840 af en af sine Elever en *Prionus coriarius* Fbr. ♂ med følgende abnorme Thorax. Mesothorax, som manglede Hornbeklædning, bar i Stedet for Dækvinger (elytra) et Par fuldstændige, opad og bagud rettede Ben, nøjagtig indføjede paa det Sted, hvor Dækvingerne ellers er indleddede. Metathorax bar som ellers Vingerne (alae). Bagkroppen var ikke mere hærdet paa Dorsalsiden, end den normalt er det under Dækvingerne. Under Flyveforsøg bevægedes de opad rettede Ben samtidig med Vingerne. Alle øvrige Bygningstræk var normale, naar undtages, at Scutellum manglede, og at Prothorax kun havde to Torne.

4. N. M. Richardson (5) klækkede i 1887 en *Zygaena filipendulæ* ♂, som havde fem Vinger, men samtidig kun fem Ben. Det paagældende Individ var som Puppe sammen med c. 700 andre taget i et Kalkbrud i Nærheden af Cambridge. Venstre Bagben manglede, saa vidt det kunde ses, ganske, og i Stedet indtoges dets Plads af en femte Vinge, som var meget mindre end de normale Bagvinger, lidt afvigende i Farve og lidt foldet, uden dog paa nogen Maade at kunne kaldes misdannet. Denne Vinge formodedes at have været ubevægelig paa det levende Insekt. — Bateson (1) har sammen med Sharp haft Eksemplaret til Undersøgelse; de kunde imidlertid ikke naa til et ganske bestemt Resultat med Hensyn til den overtallige Vinges Tilhæftningssted, da de ikke maatte beskadige Præparatet ved at fjerne Vingen eller den tætte Haarbeklædning, som omgav dens Basis. Sharp er tilbøjelig til at antage, at Tilhæftningen findes langs bageste Coxa og beskriver under denne Forudsætning Individet som en Abnormitet, der paa

bageste Coxa i Stedet for et normalt Ben bærer en reduceret Vinge, idet han dog gør opmærksom paa, at en indgaaende Undersøgelse muligvis vilde give et helt andet Resultat. Bateson gengiver to Tegninger af Richardson, der forestiller Dyret set fra Undersiden og den forstørrede, overtallige Vinge.

Foruden disse 4 Tilfælde af Homoeosis hos Insekter beskriver Bateson en Række Tilfælde hos Crustaceer. Det vil imidlertid føre for vidt her at komme ind paa saavel disse interessante Tilfælde som de talrige andre, der siden er samlede. En Undtagelse skal dog gøres for Herbst's eksperimentelle Arbejders Vedkommende, idet de ganske kort skal gøres til Genstand for Omtale.

C. Herbst (6), som ønskede at klarlægge den Rolle, Hensigtsmæssigheden spiller inden for Regenerationen, stillede sig følgende Spørgsmaal: Regenererer Krebsdyr Øjnene, og vil de ogsaa gøre dette i Mørke, hvor disse Organer ikke er dem til nogen Nytte, og hvor deres Regeneration følgelig vil være overflødig? Resultaterne, som opnaaedes under Forsøgene, er i korte Træk følgende.

Fjernes hos en *Palaemon*, *Palinurus*, *Sicyonia*, m. fl. det ene af Stilkøjnene, regenereres Øjet som saadant. Fjernes derimod Stilken tillige med Øjet, faaes i en Del Tilfælde et antennelignende Regenerat. Denne højst mærkelige Forskellighed i Regeneraternes Beskaffenhed viste sig at staa i Forbindelse med, at Ganglion opticum hos disse Krebsdyr har sit Sæde i Øjenstilken og saaledes fjernes samtidig med denne. Hos Former, som har Ganglion opticum beliggende nærmere Hjernen, saaledes at det ikke berøres af Øjenstilkeksstirpationen, lykkedes det derimod aldrig at frembringe antennelignende Regenerater, idet der i alle Tilfælde gendannedes et Øje i Stedet for det bortfjernede. Ved Sammenligning af disse Heteromorphoser med de normale Kropvedhæng kom Herbst til det Resultat, at det kun kan dreje sig om antennelignende Dannelser, som i Bygning nærmest slutter sig til første Antennepar (antennulae).

Herbst tager bestemt Afstand fra at forklare disse ejen-

dommelige Udvæksters Fremkomst som et Udslag af Atavismus. Som Holdepunkt for denne sin Anskuelse betragter han blandt andet Resultatet af følgende interessante Forsøg.

Fjernes hos f. Eks. visse *Palaemon-* eller *Palinurus*-Arter paa den distale Ende af et Stilkøje et kalotformet Parti og trækkes Øjengangliet ud af det dannede Saar ved Hjælp af en Pincet, faas et antennelignende Regenerat paa den bibeholdte Øjenstilk.

Herbst mener herved at have bevist, at de samme Celler i Øjenstilken, alt eftersom de er udsatte for den formative Indflydelse af Ganglion opticum eller ej, formaar at regenerere henholdsvis et nyt Øje eller — naar Regeneration da overhovedet indtræder — et helt andet Organ, en Antennula.

I 1910 har H. Przibram (7) samlet et større Antal Homoeosistilfælde sammen fra Litteraturen; hertil føjer han selv enkelte nye Eksempler. Her skal kun nævnes, at Przibram beskriver, refererer og til Dels afbilder en hel Række Tilfælde hos Lepidopterer (*Zygaena*, *Cucullia*, *Adela*) og et enkelt fra en Coleopter-Slægt (*Prionus*). I et Skema er endvidere samtlige Tilfælde hos saavel Krebsdyr som Insekter samlede paa en let overskuelig Maade.

De Tilfælde, som har særlig Interesse for det foreliggende Arbejde, skal nærmere fremdrages i Slutningen af Afhandlingen.

Stor Interesse knytter der sig til de Regelmæssigheder, som Przibram søger at udfinde midt i Mængden af de tilsyneladende ganske uensartede Fænomener, som gaar under Betegnelsen Homoeosis. Han søger herved at bringe os nærmere Forstaaelsen af Homoeosisfænomenet og at finde et Grundlag for en eksperimentel Bearbejdelse af det foreliggende Materiale, uden hvilken det næppe vil blive muligt at bevise de fremsatte Hypotheser om de homoeotiske Dannelsers Opstaaen m. m.

I 1896 havde Wheeler (8) inddelt Homoeosis i substitutiv og adventiv. Przibram bibeholder nu denne Inddeling under Tilføjelse af en tredie Form, translativ Homoeosis.

De tre Grupper karakteriseres paa følgende Maade:

Substitutiv Homoeosis. (Wheeler: „substitutional homoeosis". Przibram: „Ersatz-H.", Substitution, Homoeosis s. str.). Denne Form bestaar i Erstatning af et Vedhæng („Gliedmass") ved et andet, som normalt tilhører et andet Segment.

Adventiv Homoeosis. (Wheeler: „redundant or adventitious homoeosis." Przibram: „Zusatz-H.", Adventive H., Heterotopie.). Denne Form bestaar i Tilføjelse af en Dannelse, som hører hjemme paa et andet Segment, til et Sted, som forøvrigt er normalt udstyret.

Translativ Homoeosis. (Przibram: „Versatz-H.", Translation, translative H., Heterophorie.). Denne Form bestaar i Henflytning af Dannelser, som mangler paa deres normale Plads, til Steder paa et andet Segment.

I Oversigtsskemaet opstiller Przibram de enkelte Tilfælde med Tilføjelse af, hvilken af ovennævnte tre Grupper de hører ind under. Under Henvisning til Originalafhandlingen skal jeg her undlade at beskrive de forskellige Typer.

Som Aarsag til den substitutive Homoeosis's Opstaaen nævnes Regeneration. Denne Aarsagssammenhæng skal med Sikkerhed være fastslaaet i mange Tilfælde og gælder højst sandsynligt ogsaa for de resterendes Vedkommende.

Som Aarsag til den adventive og translative Homoeosis synes ved Siden af arvelige Variationer ogsaa embryonale Omlejringer at komme i Betragtning.

Da alene den substitutive Homoeosis har Interesse for det følgende, skal jeg holde mig til denne Form og ganske kort nævne et Par af de Regler, som Przibram udleder for denne Gruppes Vedkommende.

I Stedet for højere differentierede Dannelser vil der altid optræde mindre differentierede. For Arthropodernes leddede Vedhængs Vedkommende betinger dette, som Følge af at Differentieringshøjden af Vedhængene aftager forfra bagtil, at de homoeotisk forandrede Vedhæng ligner

de normale paa et efterfølgende Segment. Denne Regel gælder ikke for Vingerne, idet Rækkefølgen her er omvendt. En Bagvinge vil saaledes altid vise sig at være erstattet med en Forvinge; det omvendte er aldrig iagttaget.

Da det i flere Tilfælde (Crustaceer) er paavist og for de øvrige (Insekter) analogt maa antages, at Aarsagen til den substitutive Homoeosis er at søge i Regenerationsprocesser, kan den opfattes som en vidtgaaende regenerativ Hypotypi.

I Slutningen af sin Afhandling gør Przibram opmærksom paa den ejendommelige, meget iøjnefaldende Prædisposition, som bestemte Krebsdyr- og Insektslægter har til Homoeosis. Af 8 Tilfælde hos Lepidopterer træffer de 6 *Zygaena*. Samtlige Tilfælde hos Coleopterer (2 (+ 1)) angaar *Prionus*. Af 6 Tilfælde hos Krabber forekommer de 5 hos *Cancer*. Tilfældigheder synes udelukkede her.

Endnu mærkeligere er det, at denne Prædisposition kan forfølges inden for de enkelte Homoeosiskategorier. Ialt kendes saaledes 5 Tilfælde af Erstatning af Bagvinge med Forvinge; af disse falder de 4 paa *Zygaena*-Arter, det femte paa den nærbeslægtede *Adela*. Translativ H. repræsenteres alene af *Prionus*. Lignende Forhold gør sig gældende for Crustaceernes Vedkommende.

Da Przibram agter at tage fat paa eksperimentelle Homoeosisstudier, slutter han sin Afhandling med at bede om *Prionus*-Materiale, idet han bemærker, at man til disse Forsøg selvfølgelig fortrinsvis bør vælge det Materiale, som Naturen selv udpeger som prædisponeret.

Ved Gennemgang af Listerne over Arthropodelitteratur i „Zoologischer Jahresbericht" 1891—1911 er jeg stødt paa følgende Homoeosistilfælde, som synes at være undgaaet Przibram's Opmærksomhed under hans Samlerarbejde (7).

Bateson (9) beskriver et Eksemplar af *Asellus aquaticus*, som har venstre Antennula erstattet af en Mandibel.

Shelford (10) fandt ved Dissektion af en Kakerlak, der sandsynligvis var nærbeslægtet med *Panesthia sinuata* Sauss., at

højre Maxil var erstattet af en haard, chitiniseret Dannelse, som overfladisk set ligner en Mandibel. Venstre Maxil og begge Mandibler var normale. Ved nærmere Undersøgelse viste det sig, at den abnorme, højre „Maxil" var opbygget af fire, ubevægelig forbundne Led. Shelford nævner uden at drage nogen bestemt Slutning angaaende Abnormitetens Natur, at man hos en anden *Panesthia*-Art har fundet Mandiblerne segmenterede i den embryonale Tilstand.

Osburn (11) beskriver en ♂ af Dipteren *Syrphus arcuatus* Fallén, som ganske mangler det store, sammensatte Øje paa Hovedets venstre Side. En tredje Antenne findes paa denne Side af Hovedet, bag ved den normale, fra hvilken den er fuldstændig adskilt, idet den har sit Sæde i sin egen Fossa. Antennen er næsten ganske normalt bygget, dog mangler Dorsalbørsten, Arista, og hele Dannelsen er lidt under normal Størrelse. Osburn nævner Herbst's Crustaceeforsøg og udtaler den Formodning, at Øjet i det foreliggende Tilfælde under Metamorphosen kan være blevet beskadiget og derpaa erstattet af Antennen.

I sin „Experimental-Zoologie" 2. Regeneration nævner Przibram senere følgende Tilfælde, iagttaget af Tornier (12), som et formentligt Homoeosistilfælde. Tornier bortskar højre Antenne paa en Del Larver af *Tenebrio molitor*, som syntes at befinde sig nær Forpupningstiden. Fem af disse Larver forpuppede sig 7 Dage efter Operationen og viste som Pupper begyndende eller ret fremskreden Antenneregeneration. Medens de fire af disse Pupper gav Imagines med normale Regenerater, viste den femte Imago følgende mærkelige Regenerat. Distalt paa den skaanede Antennestump, som bar Amputationssaaret i 4. Led, var der ved Regeneration fremkommet en kloagtig Dannelse, som sad ganske fast paa Udspringsstedet og ikke viste nogen Leddeling.

Křížený (13) har i en mindre Afhandling gjort eet af Przibram's Tilfælde af translativ H. til Genstand for Kritik. Det paagældende Spørgsmaal er imidlertid uden Interesse for dette Arbejde.

Efter denne almindelige Oversigt over Homoeosisspørgsmaalet inden for Insekternes Klasse skal jeg, inden jeg gaar over til at omtale mine egne Undersøgelser, paa Grundlag af Przibram's Skema (7) sammenstille de Tilfælde af Homoeosis, der er af særlig Interesse for det følgende, nemlig saadanne, i hvilke der er set tarselignende Dannelser paa Antennen.

De af Kraatz (2) og Kriechbaumer (3) beskrevne Tilfælde af tarseledbærende Antenner hos henholdsvis *Cimbex axillaris* og *Bombus variabilis* Schmkn. er udførlig refererede i den historiske Indledning til nærværende Afhandling.

Klemensiewicz (14) omtaler kort et Eksemplar af en ikke nærmere bestemt *Zygaena*-Form, ♂, med Klodannelse distalt paa begge Antenner; paa højre Side ses to Kløer, medens der paa venstre kun er een saadan Dannelse synlig.

Doumerc (15) har beskrevet en abnormt bygget Antenne hos en *Bombus agrorum* Latr. Przibram har, da her maaske foreligger et Tilfælde af lidet udviklet Tarsedannelse paa Antennen, opført dette Tilfælde paa sit Oversigtsskema, dog med Tilføjelse af et Spørgsmaalstegn.

Fælles for ovennævnte Homoeosistilfælde, som alle af Przibram henregnes til Gruppen, substitutiv Homoeosis, er, at deres Tarsebestanddele har Sæde paa en Stilk af Antenneled. I dette Bygningstræk stemmer de saaledes overens med det spontane *Carausius*-Tilfælde, som skal beskrives nærmere i det følgende.

Nævnes i denne Forbindelse skal endvidere en af Jacobs (16) beskrevet og afbildet *Tenthredopsis nassata* ♂ var., som paa højre Side af Hovedet foruden den normale Antenne tillige bærer et ejendommeligt, leddet Vedhæng, der ved Siden af 2. Antenneled udspringer distalt paa Rodleddet. Jacobs udtaler sig ikke om denne Dannelses Natur. Przibram opfører Tilfældet paa Skemaet paa følgende reserverede Maade. I Rubrikkerne „Morphologischer Wert des abnormen Gebildes“ og „Ersatz-, Zusatz- oder Versatz-Homoeosis“ staar skrevet ud for dette Tilfælde henholdsvis „Fuss?“ og „Zusatz?“.

Til Slut skal endelig henvises til det ovenfor refererede Tornier'ske *Tenebrio*-Tilfælde.

II. Egne Undersøgelser.

Efter denne Oversigt over, hvad der foreligger i Litteraturen om Homoeosis hos Insekter, skal jeg gaa over til at omtale mine egne Undersøgelser over homoeotisk Regeneration af Antennen hos en Phasmide, *Carausius (Dixippus) morosus.* Da det under disse er lykkedes formentlig for første Gang for Insekternes Vedkommende at føre et typisk Homoeosistilfældes Opstaaen tilbage til Regeneration, kan disse Iagttagelser mulig paaregne nogen Interesse.

Udgangspunktet for mine Undersøgelser er et Tilfælde af substitutiv Homoeosis, som jeg er stødt paa i en Kultur af den i insektbiologisk interesserede Kredse meget udbredte Phasmideart, *Carausius (Dixippus) morosus.* Dette interessante Insekt, som har sit Hjem i Forindien, formerer sig i hvert Tilfælde i Fangenskab næsten udelukkende parthenogenetisk.

Om dette spontane Homoeosistilfælde skal jeg meddele følgende.

D. 16. Okt. 1911 udtoges en Del halvvoksne *Carausius*-Larver til nogle Regenerationsforsøg. Kulturen, som bestod af henved 50 ♀-Larver, var noget forsømt, hvad friskt Foder (Rosenblade) angaar, og derfor stærkt medtaget af Kannibalismus. Dette Fænomen støder man paa, saa snart der er Tale om Masseopdræt af disse Insekter. Selv om Foderet altid holdes friskt, vil Kannibalismen dog ofte komme til at gaa ud over Individer, som befinder sig i Hudskifte. Saaledes var det nu gaaet i denne Kultur; en Mængde Larver var lemlæstede, berøvede Lemmer og Antenner i forskellig Udstrækning, og det var derfor ikke let at finde ganske fejlfri Eksemplarer.

Et Individ tiltrak sig min Opmærksomhed i særlig Grad. Dets højre Antenne var afbidt paa nær en ganske kort Stump, paa hvis distale Ende der sad en lille Klump, som for det ubevæbnede Øje nærmest tog sig ud som et lille Nøgle af sammenvoksede An-

tenneled. Da det kunde have sin Interesse at se, hvorledes denne Dannelse vilde slippe gennem Hudskifterne, medtoges Dyret til Regenerationsforsøgene og fik venstre Forben amputeret helt oppe ved Trochanter.

Larven, som fodredes med friske Vedbendblade, var paa dette Tidspunkt c. 5 cm. lang.



Fig. 1.
Spontant Tilfælde af substitutiv Homoeosis af Antennen hos en Larve af *Carausius (Dixippus) morosus*. Hovedet set fra Dorsalsiden. Mikrofotografi taget kort Tid efter Hudskiftet d. 24. Okt. 1911. Forstørrelse c. 7—8 Gange.

D. 24. Okt. 1911 skiftedes Ham. Den afkrængede Ham aad Dyret desværre i Nattens Løb. Det amputerede Ben var ikke regenereret. Den abnorme, højre Antenne var derimod undergaaet en højst interessant Forvandling, idet „Nøglet" paa Enden af Antennestumpen var blevet til et tydeligt tarselignende Led med et stort Empodium og to svagt udviklede, men dog tydelige Kløer. Denne ejendommelige Dannelse var blaagrøn d. v. s. blodfarvet i Modsætning til Dyrets Krop og Lemmer, som er lysegrønt pigmenterede.

Fig. 1 [1]) gengiver i Mikrofotografi med 7—8 Ganges Forstørrelse Hovedet af Dyret kort Tid efter Hudskiftet. Fotografiet er ligesom Fig. 2 og 6 taget efter det dybt æthernarkotiserede Dyr. (Chloroformnarkose giver i Forbindelse med den mindste Berøring ofte Autotomi af flere Lemmepar).

Paa Fig. 1 vil man straks kunne se den betydelige Forskel, som der er til Stede mellem de to Antenner. Paa den abnorme

---

[1]) Mikrofotografierne, som velvilligst er tagne af Assistent v. D. kgl. Veterinær- og Landbohøjskoles Serumlaboratorium, Hr. Dyrlæge M. Christiansen, er ikke retoucherede.

Antenne findes inderst det store, agurkekærneformede Rodled, som bærer en kort, tynd Stamme, bestaaende af 4 utvivlsomme Antenneled. Denne Stamme bærer et skraatstillet, nærmest ovalt, distalt betydelig fortykket Led, som peger over mod den normale Antenne. Lateralt paa dette uregelmæssige Led, som paa flere Steder bærer smaa, knopformige Udvækster, har Kloleddet sit Tilhæftningssted. Dette Led er nærmest tenformet og bærer distalt et veludviklet Empodium og et Par lidet udviklede Kløer, som paa hver sin Side slutter tæt op til Empodiets Dorsalflade. Dette Led er spredt behaaret ligesom Tarsens Kloled.

De normale Forhold i Størrelse og indbyrdes Stilling, som er til Stede mellem Empodium og Kløer paa Tarsus, vil kunne ses paa Fig. 5.

Sammenligner man nu denne abnorme Antenne med den normale, vil forskellige Størrelsesforhold kunne iagttages. Højre Rodled er saaledes noget kortere end venstre. Antenneleddene, som danner Stammen af den abnorme Antenne, er betydelig spinklere end de tilsvarende normale. Den højre Antenne hæfter sig paa Rodleddet med en langt mindre Basis end den venstre.

Næste Hudskifte fandt Sted d. 18. Nov. 1911; ved denne Lejlighed lykkedes det at redde den afskudte Ham, som konserveredes i Alkohol. Med dette Hudskifte traadte Dyret ind i Imagostadiet, som naaes efter 6 Hamskifter. D. 3. December begyndte Lægningen af parthenogenetiske Æg.

Antenne-Kloleddet viser efter dette Hamskifte et noget forandret Udseende, saaledes som det delvis vil kunne ses paa Fig. 2. Empodium er blevet reduceret til en lille, rund Knop, medens Kløerne er tiltaget i Størrelse og krummer sig nedad med stærkt chitiniserede, brunfarvede Spidser. Paa Undersiden af det uregelmæssige Led, som bærer Kloleddet, findes 4 empodiumlignende Udvækster, der sidder sammen to og to, adskilte indbyrdes ved dybe Furer. Ved Sammenligning af dette Tilfælde med lignende fra det øvrige Materiale har det vist sig, at her er Tale om Dannelser, som ganske svarer til Plantula-Parret, saaledes som det

findes paa Undersiden af 1., 2., 3., 4. Tarseled. Med sit dobbelte Plantula-Par er det uregelmæssige Led muligvis en Dannelse, opstaaet ved Sammenvoksning af to uudviklede Tarseled.

Den abnorme Antennes Længde i denne fuldtudviklede Skikkelse er c. 6 mm. Antennen hos en normal Imago maaler c. 36 mm.

Forskellige Forhold ved dette spontane Homoeosistilfælde maatte lede Tanken hen paa, at der her forelaa en Regeneration af højre Antenne. Herpaa tydede saaledes den abnorme Antennes Spinkelhed i Sammenligning med den kraftige normale, en Størrelsesforskel, som jo saa ofte optræder efter Regeneration. Forbindelsen mellem Rodleddet og det smalle 2. Led pegede hen paa, at Regenerationen sandsynligvis har taget sit Udspring fra selve Rodleddet. Hertil kom saa de ydre Forhold, under hvilke Dyret var vokset op, omgivet af en Flok mere eller mindre lemlæstede Kammerater med udprægede kannibalske Tilbøjeligheder.



Fig. 2.
Hovedet, set fra Dorsalsiden, af samme Dyr, som gengivet i Fig. 1. Mikrofotografi taget kort Tid efter Hudskiftet d. 18. Nov. 1911 med 6—7 Ganges Forstørrelse.

Jeg formodede følgelig, at højre Antenne i sin Tid var blevet afbidt lige distalt for Rodleddet eller snarere et lille Stykke inde paa dette og derefter var regenereret i den ovenfor beskrevne, højst ejendommelige Skikkelse.

Det laa saaledes nær at paabegynde Regenerationsforsøg med Partiet mellem Rodled og 2. Antenneled, specielt Sømmen mellem disse to Led, som Amputationssted. Forhold, som er dette Arbejde uvedkommende, forhindrede mig desværre i at skænke disse Forsøg den fornødne Tid og Opmærksomhed. Det blev saaledes nødvendigt

at foretage Amputationerne paa fri Haand ved Hjælp af en fin Saks uden Kontrol af et Præparationsmikroskop. Med denne primitive Teknik lykkedes det naturligvis ikke altid at foretage Amputationen lige paa det tilsigtede Sted, f. Eks. en Grænselinie mellem to Led; ofte bortskares der for meget, medens der til andre Tider bibeholdtes Dele, som skulde have været fjernede. Denne uheldige Omstændighed indskrænker selvfølgelig Forsøgenes Værdi paa mange Maader, men da de alligevel har bragt nye Ting for Dagen, skal jeg i det følgende meddele de indvundne Resultater.

Regenerationsforsøgene paabegyndtes i November 1911 og strakte sig til Marts 1912. Som Materiale tjente 50 Stk. nyudklækkede og c. 60 Stk. halvvoksne *Carausius*-Larver, alle fremkomne af ubefrugtede Æg. Amputationerne foretoges paa Øjemaal med en fin, kortkæbet Saks, for de nyudklækkede Larvers Vedkommende under Æthernarkose, da det uden denne var vanskeligt at haandtere disse smaa, fine Skabninger. Amputationerne foretoges i de fleste Tilfælde saa vidt muligt paa Grænsen mellem Rodled og andet Antenneled, i andre bibeholdtes begge nævnte Led. Paa een Del af Dyrene bortfjernedes højre, paa en anden venstre og paa en tredie begge Antenner. Som Foder gaves friske Vedbendblade, der daglig oversprøjtedes med Vand. Denne Behandling taalte Flertallet af disse haardføre Dyr gennemgaaende ret godt, om det end maa siges, at Dødeligheden var betydelig over den normale — alle Tilfælde af Kannibalisme undtagne. Særlig de Individer, som havde mistet begge Antenner, syntes at være lidet levedygtige.

Resultaterne af disse Amputationer kunde overskues efter et Par Maaneders Forløb. I en Del af Tilfældene var Dyrene gaaet til Grunde, i en anden var Regeneration ikke indtraadt, idet der højst var skudt en lille Knop frem paa Amputationsstedet, men i en tredje var der Regeneration med Dannelse ikke blot af et enkelt Kloled, men tillige af en Række dermed forbundne Tarseled og — i et Mindretal af Tilfældene — med Tilføjelse af et tibialignende Led.

Fig. 3 gengiver et saadant Regenerat, stammende fra en

Imago. Som det vil ses, forefindes et stort Kloled og 3 andre Tarseled. Bekræftelse paa, at det her virkelig drejer sig om en Tarsedannelse, faaes ved Sammenligning med Fig. 4, som viser en, efter Amputation af et Ben, nylig gendannet Fod.

Fig. 6—7 gengiver de fuldkomneste Regenerater, som ved Siden af en Tarsus ogsaa har en tibia-lignende Del; de vil blive Genstand for nærmere Beskrivelse i det følgende.

En iøjnefaldende Forskel mellem de Regenerater, jeg her fik

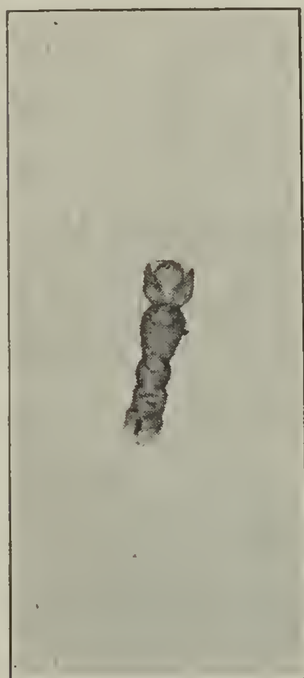


Fig. 3.



Fig. 4.

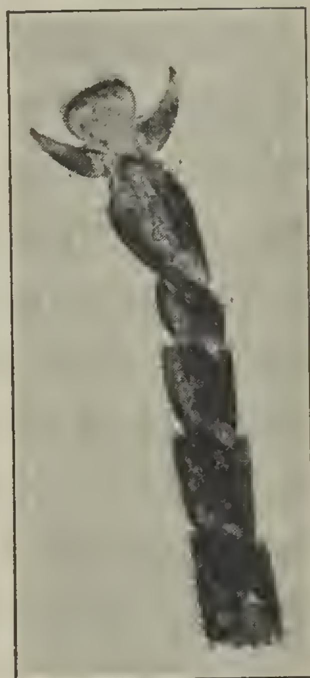


Fig. 5.

Fig. 3. Experimentel Homoeosisdannelse fra en næsten fuldtudviklet *Carausius*-Larve. Regeneratet, som er set fra Dorsalsiden, bestaar af Kloled + 3 smaa, korte Tarseled uden tydeligt udviklede Plantula-Par. Dannelsen har siddet direkte paa Rodleddet og henhører saaledes til de under Gruppe A beskrevne. — Mikrofotografi efter Præparat indlejret i Kanadabalsam. Forstørrelse: c. 16 Gange. Fig. 4. Distale Ende af et ungt Benregenerat fra en *Carausius*-Larve, Mikrofotografi, taget fra Dorsalsiden, med c. 16 Ganges Forst. Fig. 5. Normal Tarse af *Carausius*-Imago, set fra Dorsalsiden. 1. Tarseled ses kun i sin halve Længde. Kanadabalsam. Mikrofotografi, Forstørrelse; c. 16 Gange.

frem, og det spontane Tilfælde er, at førstnævnte ikke er anbragt paa en Stamme af Antenneled, men udspringer direkte fra Rodleddet eller andet Antenneled. Efterhaanden som Hudskifterne fandt Sted, udvikledes Regeneraterne mere og mere, især paa de unge Larver, som havde adskillige Hamskifter at gennemgaa. Ligheden mellem de tarselignende Antennedannelser og en virkelig Tarsus tiltog efterhaanden som Udviklingen skred frem.

Trinfølgen i Regeneraternes Udvikling er omtrent følgende.

Første Hamskifte efter Amputationen bringer sjælden nogen

egentlig Nydannelse for Dagen; Amputationssaaret ses sammenvokset, maaske forsynet med en kort, knopformet Udvækst. Først ved det følgende Hamskifte fremkommer der Regenerater med en kort Stamme af ikke nærmere adskilte Tarseled og et om end lidet udviklet, saa dog tydeligt Kloled med tilhørende Dannelser. Regeneraterne paa dette Trin har, som det vil kunne ses, endnu



Fig. 6.



Fig. 7.

Fig. 6. Eksperimentel Homoeosisdannelse fra en halvvoksen *Carausius*-Larve. Forkropsparti set fra Ventralsiden. Tilfældet er nærmere beskrevet under Gruppe B. Mikrofotografi taget med 5—6 Ganges Forstørrelse. Fig. 7. Forkropsparti, set fra Dorsalsiden, af samme Dyr, som gengivet i Fig. 6. Imagostadium. Mikrofotografi taget med 5—6 Ganges Forstørrelse.

ikke naaet den Uddifferentiering, som den i Fig. 3 gengivne Type har. Ved de næste Hamskifter udvikles Tarsen videre, idet de enkelte Led adskilles indbyrdes paa normal Maade og paa Plantarfladen udvikler hver sit Plantula-Par. Endvidere vil Størrelsesforskelligheder mellem Leddene indbyrdes træde frem; første Tarseled bliver saaledes betydelig længere end de nærmest paafølgende (smlg. Fig. 7) ganske som paa den normale Fod. Hos 4 Individer har der yderligere som Bærer af Tarsen skudt sig et stort, tibia-

lignende Led frem fra Amputationsstedet i andet Antenneled (smlg. Fig. 7).

Mit Materiale af disse mere eller mindre veludviklede, homoeotiske Regenerater omfatter 20 Tilfælde. I alle disse er Regeneraternes Natur bestemt ved Tilstedeværelsen eller Ikke-Tilstedeværelsen af Kloled eller, hvor disse manglede, af plantulabærende Led. I en hel Del Tilfælde, hvor der forefandtes Regenerater, bestaaende af en kort Stamme af udifferentierede Led, har jeg ikke indladt mig paa at stille Differentialdiagnosen mellem Antenneled og Tarseled; disse Tilfælde er følgelig ikke medtaget ved Materialets Optælling.

For at faa en Oversigt over det foreliggende Materiale er det nødvendigt først at mærke sig dets forskellige Ufuldkommenheder. Dyr med Amputationer, foretaget i forskellig Udstrækning (i første eller i andet Antenneled), og af den forskelligste Alder har saaledes gaaet sammen. Den anvendte Amputationsteknik har, som før nævnt, været ret unøjagtig. Det er derfor udelukket med Bestemthed at kunne fastslaa i det enkelte Tilfælde, hvor Amputationen i sin Tid fandt Sted, og heraf drage Slutninger angaaende Amputationsstedets Indflydelse paa Regeneratets Natur. Det er heller ikke muligt for de forskellige Individers Vedkommende at afgøre, paa hvilket Alderstrin de stod, da Amputationen fandt Sted, et Forhold, der jo er af største Betydning for Regeneraternes Udvikling, da denne i lige saa høj Grad som hele den øvrige Organismes er afhængig af Hudskifterne.

Helt udelukket har det selvfølgelig i de fleste Tilfælde ikke været med Tilnærmelse at kunne bestemme Amputationsstedet. Da Amputationerne i de foreliggende Forsøgsrækker alle er knyttede til første eller andet Antenneled, har jeg ved denne Bestemmelse altid ladet Forbindelsesforholdet mellem Regeneratet og det Led, hvorfra dette udspringer, være det afgørende. Andet Antenneled udfylder paa Grund af sit større Tværmaal hele Pladsen distalt paa Rodleddet, medens de som oftest spinkle Regenerater udspringer paa dette brede Led med en langt mindre Basis. Ved disse Be-

stemmelser letter en Sammenligning med en tilstedeværende, normal Antenne selvfølgelig meget (smlg. de to Antenner paa Fig. 1 og 2).

Ved Gennemgangen af Materialet har jeg særlig haft min Opmærksomhed henvendt paa Regeneraternes Udspring, Bygning og Størrelse.

En Inddeling af Materialet efter Amputationssted vil give følgende to Grupper.

Gruppe A. Amputationerne foretaget i Sømmen mellem Rodled og andet Led eller muligt et lille Stykke inde paa Rodleddet.

Regeneraterne i denne Gruppe, som omfatter de 14 af 20 Tilfælde af homoeotisk Antenneregeneration, er kun smaa, fra 0,5—2 mm. lange. Ledantallet svinger imellem 1 og 4. Regeneraterne er ofte af et stærkt forkrøblet Præg, krogede, forvredne eller spiralsnoede. Som oftest forefindes et uforholdsmæssig stort Kloled sammen med to—tre ganske smaa, plantulabærende Tarseled. Kloled kan ofte forefindes i disse Regenerater, uden at der samtidig er Plantula-Par udviklede paa de øvrige Led og omvendt.

Næsten alle Tilfælde inden for denne Gruppe falder paa Imagines, saaledes at den Mulighed ikke helt kan udelukkes, at den mangelfulde Genvækst kan skyldes Amputation paa et senere Alderstrin og de deraf følgende færre Hudskifter. Paa Grund af Dværgagtigheden i hele Anlægget hos de fleste af disse Dannelser maa jeg dog betragte det for udelukket, at der i det hele taget skulde kunne blive Tale om en videre Udvikling gennem Overgangsformer til de ret fuldkomne Regenerater, vi træffer under Gruppe B.

Gruppe B. Amputationerne foretaget i Sømmen mellem andet og tredie Antenneled eller muligt et Stykke inde paa andet Antenneled. Medens vi inden for den foregaaende Gruppe kun træffer Tilfælde af ret ensartet Bygning og Udviklingsgrad, møder vi i denne Gruppe et Mindretal, bestaaende af 6 Tilfælde, som efter deres forskellige Bygningstræk maa deles i to Klasser.

Til den ene af disse, som indeholder fire Tilfælde, henhører de største og højest udviklede Regenerater inden for det samlede Materiale. Disse bestaar af 4 veludviklede Tarseled og et tibialignende Segment, der som et stort, uleddet Stykke er indskudt mellem Amputationssted og første Tarseled. Det smukkeste Tilfælde inden for denne Klasse er paa forskellige Alderstrin gengivet i Fig. 6 og 7. En Beskrivelse af dette interessante Regenerat vil bedre end noget andet kunne illustrere disse Formers Bygning.

Paa Basis af en Del af andet Antenneled, som formentlig har været Genstand for en delvis Amputation, skyder der sig frem et c. 2 mm. langt, tibialignende Led, som fra en Indsnøring nær Udspringsstedet fortykkes jævnt udad. Det bærer Længdekamme, besat med ganske smaa, stive, mørkebrune Børster, ganske som de træffes paa den normale Tibia. Dette lille Bygningstræk maa, naar det betragtes sammen med Indføjningsstedet i direkte Tilslutning til Tarsen, vel yderligere retfærdiggøre Anvendelsen af Betegnelsen „tibialignende". Nævnes skal, at man paa Antenneleddene kun træffer spredt Behaaring. Ledforbundet med den korte, tibialignende Del haves det lange, slanke første Tarseled, hvorpaa følger to ganske korte Tarseled. Disse tre Led bærer paa Plantarfladerne hver sit smukt udviklede Plantula-Par. Som fjerde Tarseled træffes endelig et veludviklet Kloled med stort Empodium og to kraftige, krummede Kløer. Dette Regenerat maaler ialt c. 8 mm., heraf falder 3,7 mm. paa Tarsen. Tarsus hos en Imago maaler med sine 5 Led c. 6 mm.

Af de andre Tilfælde inden for denne Klasse falder de to paa næsten fuldt udviklede, det ene paa et halvvoksent Individ.

Til den anden Klasse hører kun 2 Regenerater, som begge er forefundet hos Imagines. De adskiller sig væsentligst fra de øvrige Regenerater i denne Gruppe ved Mangel af det tibialignende Segment. De bestaar saaledes kun af indtil 4 veludviklede Tarseled, som i Størrelse er jævnbyrdige med de tilsvarende Dannelser i de ovenfor nævnte 4 Tilfælde.

Muligvis kan disse Regenerater, naar de ydre Forhold tillader

det, udvikles videre og forøges med det tibialignende Segment, som alene adskiller dem fra Gruppens øvrige Tilfælde.

Nævnes skal i denne Forbindelse, at Antennetarserne ligesom Tarseregenerater paa Lemmerne højst bestaar af fire Led i Modsætning til den femleddede normale Tarsus.

Gruppe C. Denne Gruppe, som ikke er repræsenteret i det eksperimentelle Materiale, rummer kun det tidligere beskrevne, spontane Regenerat. Denne Dannelse adskiller sig ved sin Stamme af antenneledlignende Segmenter skarpt fra de ovenfor opstillede Typer. Intet Steds i mit øvrige Materiale er jeg stødt paa et Tilfælde, hvor jeg med blot nogenlunde Sikkerhed har kunnet konstatere Tilstedeværelsen af en Antenneledsstamme som Bærer af Antennetarsen.

Søger man en anden Inddeling af Materialet, vil man f. Eks. med Regeneraternes forskellige Sammensætning som Inddelingsgrund kunne opstille to Grupper, rummende henholdsvis Regenerater, som alene er opbygget af Tarseled, og saadanne, som foruden Tarseled tillige besidder et tibialignende Segment.

Et Forsøg paa at bringe en saadan Inddeling til at dække den ovenfor gennemførte Inddeling efter Amputationssted vil paa Grund af Spaltningen inden for førnævnte B-Gruppe mislykkes. Maaske er Aarsagen til dette negative Resultat alene at søge i Materialets Produktionsmaade og talmæssige Ufuldkommenhed. Nævnt er saaledes den Mulighed, at det ved videre Undersøgelse vil vise sig, at de to Klasser inden for Gruppe B blot repræsenterer forskellige Grader i Udviklingen af en og samme Type.

Om et muligt Afhængighedsforhold mellem Regeneraternes Bygning og Amputationsstedernes Beliggenhed skal jeg indskrænke mig til at nævne, at jeg ved Bearbejdelsen af mit Materiale har modtaget følgende Indtryk. Amputationer, foretaget i Rodleddet eller i Sømmen mellem dette og 2. Antenneled, giver dværgagtige, lidet udviklede homoeotiske Regenerater, medens Amputationer, foretaget i 2. Antenneled eller mulig i Sømmen mellem dette og 3. Antenneled, giver kraftige og særdeles veludviklede homoeotiske

Regenerater. Muligvis vil nøjagtige og omfattende eksperimentelle Undersøgelser, som skaffer alle de forstyrrende Faktorer, som har indsneget sig i mit Materiale (Forsøgsdyrenes forskellige Alder, den primitive Amputationsteknik m. m.) af Vejen, give ganske andre Resultater.

Efter disse Regenerationsforsøgs Afslutning har jeg med en fin, lille Saks under Dissektionsmikroskop foretaget talrige forskellige Amputationer paa æthernarkotiserede *Carausius*-Larver. Af de mange Amputationssteder, som lagdes til Grund for de enkelte Forsøgsrækker, skal eksempelvis nævnes Rodleddets Indføjningssted paa Hovedet, Rodleddets Midte, dets distale Del, Ledsømmen mellem dette og 2. Antenneled, mellem 2. og 3. Antenneled m. fl. Disse Amputationer lader sig let udføre med ret stor Nøjagtighed.

Desværre maatte jeg opgive disse Forsøgsrækker, førend Regeneration var indtraadt, ligesom ogsaa nogle indledende Forsøg paa at fremkalde lignende Fænomener hos et Par andre Phasmidearter, *Bacillus Rossii* Fabr. og *Diapheromera femorata* Say.

Tiltrænges der saaledes i høj Grad rationelle og omfattende eksperimentelle Undersøgelser paa dette Omraade, vil den histologiske Undersøgelse sikkert ogsaa kunne bringe interessante Oplysninger til Forklaring af disse ejendommelige Regeneraters Fremkomst. I denne Forbindelse skal nævnes den smukke Forening, som Eksperimentet og den anatomiske Undersøgelse har indgaaet under C. Herbst's ovenfor refererede Forskninger paa et lignende Omraade som det foreliggende.

Idet jeg hermed overgiver mine eksperimentelle Resultater til videre Bearbejdelse, skal jeg slutte med ganske kort at omtale, hvad der i Phasmidelitteraturen findes af Interesse for det foreliggende Spørgsmaal. Meget er det dog ikke, da man i Phasmidebiologien, hvor netop Regenerationsstudierne i sin Tid vakte betydelig Opmærksomhed, tilsyneladende har arbejdet meget lidt med Antenneregeneration.

R. dé Sinéty (17) har amputeret Antenner hos *Leptynia attenuata* med det Resultat, at der fremkom Regenerater med Led-

antal, vekslende fra 2 til 4. I et Tilfælde, hvor den ene Antenne amputeredes fuldstændig, regenererede der en lille, 4-leddet Antenne med et Rodled af kun halv normal Længde.

R. Godelmann (18) amputerede Antenner hos *Bacillus Rossii* Fabr.; om Resultaterne bemærkes kun, at Regeneraterne viste en højst langsom Vækst og aldrig naaede blot tilnærmelsesvis normal Størrelse.

Otto Meissner (19), som har beskæftiget sig meget med *Dixippus morosus* Br.'s Biologi, nævner ganske kort, at Antennerne regenererer ofte i forkortet Form, men at de ikke desto mindre kan indeholde det normale Ledantal.

Som det vil ses, har ingen af disse Forfattere iagttaget homoeotiske Regenerater.

Under Udarbejdelsen af denne Meddelelse har jeg modtaget værdifuld Støtte af Hr. Docent R. H. Stamm, som bl. a. stillede Universitetets histologisk-embryologiske Laboratoriums Bogsamling til min Raadighed; jeg bringer herfor min bedste Tak.

København i Januar 1913.

Litteraturfortegnelse.

1. Bateson, William, Materials for the Study of Variation. London 1894. pag. 85. 146.
2. Kraatz, G., Ueber eine merkwürdige Monstrosität bei *Cimbex axillaris* (Hymenopt.). Deutsch. Entomol. Zeitschr. XX. 1876 pag. 377. Smlg. Bateson (1. pag. 147).
3. Kriechbaumer, Höchst merkwürdige Missbildung eines Fühlers von *Bombus variabilis* Schmkn. Entomolog. Nachrichten. Berlin. XV. 1889. pag. 281.
4. Saage; Entomologische Zeitung herausg. Entomol. Vereine zu Stettin. I. 1840. pag. 48.
5. Richardson, N. M., Substitution of a wing for a leg in *Zygaena filipendula* ..... The Entomologist's Monthly Mag. XXV 1888—89. pag. 289. Sml. Bateson (1. pag. 149).
6. Herbst, Curt, Ueber Regeneration von antennenähnlichen Organen an Stelle von Augen. Arch. f. Entwick.-Mech. II. 1896. pag. 544—58. 2. Mitteilung. Versuche mit *Sicyonia sculpta* M. Edw. Vierteljahrschrift Naturforsch. Gesellsch. Zürich. XLI. 1896. pag. 435—54.

3. Mitteilung. Weitere Versuche mit total exstirpirten Augen. Arch. f. Entw.-Mech. IX. 1899. pag. 215—57.
4. Mitteilung. Versuche mit theilweise abgeschnittenen Augen. ibid. pag. 257—92.
5. Mitteilung. Weitere Beweise für die Abhängigkeit der Qualität des Regenerates von den nervösen Centralorganen. XIII. 1901. pag. 436—47.
6. Mitteilung. Die Bewegungsreaktionen, welche durch Reizung der heteromorphen Antennula ausgelöst werden. Arch. f. Entw.-Mech. XXX. II. Teil. p. 1—14.
Ueber die formativen Beziehungen zwischen Nervensystem und Regenerationsprodukt. Zeitsch. f. Naturwissensch. LXXIV. pag. 134. 1901. (Tagbl. 5. Int. Zool. Kongr.).

7. Przibram, Hans, Die Homoeosis bei Arthropoden. Arch. f. Entw.-Mech. XXIX. 1910. pag. 587—615. 9 Fig. im Text, Tafel XIX—XXI. (Udførlig Litteraturfortegnelse).
8. Wheeler, W. M., An Antenniform Extra Appendage in *Dilophus tibialis*, Loew. Arch. f. Entw.-Mech. III. 1896. pag. 261—68. (se pag. 267).
9. Bateson, W., On a Case of Homoeosis in a Crustacean of the Genus *Asellus* — Antennule replaced by a Mandible. Proc. Zool. Soc. London. 1900. pag. 268.
10. Shelford, R., A Case of Homoeotic Variation in a Cockroach. Transact. Entomol. Soc. London 1907. Prooceedings pag. (XXXIII)—(XXXIV).
11. Osburn, R. C., The Replacement of an Eye by an Antenna in an Insect. Science. (N. S.) XXVII. 1908. pag. 67.
12. Tornier, G., Bein- und Fühlerregeneration bei Käfern und ihre Begleiterscheinungen. Zool. Anz. XXIV. 1901. pag. 634—64. (se pag. 646—47).
13. Kříženecký, J., Ueber die Homoeosis bei Coleopteren. Einige Bemerkungen ..... Zoolog. Anz. XXXIX. 1912. pag. 579—82.
14. Klemensiewicz, S., Merkwürdige Fühlerbildung bei einer *Zygaena*-Species. Illustrierte Zeitschrift f. Entomologie V. 1900. pag. 168—69.
15. Doumerc, Sur quelques monstruosités entomologiques ... Annales de la Société Entomologique de France III. 1834. pag. 171. (se pag. 175).
16. Jacobs, Antenne complémentaire chez la *Tenthredopsis nassata* ♂ *var.* Comptes-Rendus des Séances. Soc. Entomol. de Belgique 1881. pag. XCVI—XCVII.
17. Sinéty, Rob. de, Recherches sur la biologie et l'anatomie des Phasmes. Thése. Lierre 1901. (se pag. 21).
18. Godelmann, R., Beiträge zur Kenntnis von *Bacillus Rossii* Fabr...... Arch. f. Entw.-Mech. XII. 1901. pag. 265—301. (se pag. 277).
19. Meissner, Otto, Biologische Beobachtungen an *Dixippus morosus* (*Phasm. Orth*). Entomologische Zeitschr. Frankfurt a. M. 1911.

15.—3.—1913.

Fuglene ved de danske Fyr i 1912.

30te Aarsberetning om danske Fugle.

Ved

R. Hørring.

I 1912 indsendtes fra 33 af de danske Fyr og Fyrskibe til Universitetets zoologiske Museum ialt 1012 Fugle af 76 Arter, faldne om Natten i Træktiderne. Sikker Efterretning haves om 1304 artsbestemte faldne Fugle, idet Prøver af disse ere indsendte. Ifølge Fyrmestrenes Opgivelser er yderligere opsamlet c. 625 faldne Fugle, hvoraf c. 280 vare Drosler. Nøjere Efterretning haves saaledes om c. 1929 Fugles Død ved Fyrene. I det hele er der sikkert mindst faldet 2000 Fugle.

De Fyr, hvorfra Fugle indsendtes, vare:

Graadyb Fyrskib, J. S. Ibsen Fyrskibsfører (42 Fugle fra 14 Nætter).
Blaavands Huk Fyr, S. Ross Fyrmester (31 fra 9 Nætter).
Vyl Fyrskib, J. S. Jensen Fyrskibsfører (102 fra 45 Nætter).
Horns Rev Fyrskib, H. Sonnichsen Fyrskibsf. (69 fra 8 Nætter).
Lyngvig Fyr, P. A. Larsen Fyrmester (61 fra 33 Nætter).
Bovbjerg Fyr, C. J. R. Rude Fyrmester (1 Fugl).
Lodbjerg Fyr, P. S. Pedersen Fyrmester (58 fra 26 Nætter).
Hanstholm Fyr, H. Roed, Fyrmester (40 fra 3 Nætter).
Rubjerg Knude Fyr, J. C. Boysen, Fyrmester (14 fra 4 Nætter).

(1912.)

Skagen Fyr, G. H. E. Wielandt Fyrmester (44 fra 20 Nætter).
Skagens Rev Fyrskib, A. P. Jensen Fyrskibsf. (2 fra 2 Nætter).
Nordre Rønner Fyr, L. F. Madsen Fyrmester (1 Fugl).
Læsø Trindel Fyrskib, P. V. Eriksen Fyrskibsf. (40 fra 13 Nætter).
Læsø Rende Fyrskib, P. C. Grumsen Fyrskibsf. (47 fra 14 Nætter).
Østre Flak Fyrskib, N. C. Knudsen Fyrskibsf. (86 fra 23 Nætter).
Hals Barre Fyr, M. L. Jørgensen Fyrmester (31 fra 6 Nætter).
Anholt Knob Fyrskib, F. A. M. Andresen Fyrskibsf. (25 fra 18 N.).
Schultz's Grund Fyrskib, P. Larsen Fyrskibsf. (34 fra 3 Nætter).
Fornæs Fyr, A. Kruse Fyrmester (3 fra 2 Nætter).
Hjelm Fyr, A. P. Jensen Fyrmester (4 fra 2 Nætter).
Thunø Fyr, C. Kjeldsen Fyrpasser (1 Fugl).
Sejrø Fyr, N. J. Z. Nielsen Fyrmester (4 fra 3 Nætter).
Vestborg Fyr, P. W. Sørensen Fyrmester (9 fra 6 Nætter).
Nakkehoved Fyr, W. Schultz Fyrmester (14 fra 4 Nætter).
Lappegrunden Fyrskib, J. C. Jensen Fyrskibsf. (4 fra 3 Nætter).
Drogden Fyrskib, N. J. Kromann Fyrskibsfører (2 fra 2 Nætter).
Stevns Fyr, L. D. A. Wedén Fyrmester (1 Fugl).
Sprogø Fyr, A. V. Hansen Fyrmester (25 fra 2 Nætter).
Hov Fyr, H. V. O. Westermann Fyrmester (6 fra 5 Nætter).
Kjels Nor Fyr, J. C. Ryder Fyrmester (173 fra 10 Nætter).
Hammeren Fyr, A. M. Dam Fyrmester (7 fra 2 Nætter).
Gedser Fyr, P. A. C. Lindgaard Fyrmester (5 fra 3 Nætter).
Gedser Rev Fyrskib, J. Jensen Fyrskibsfører (26 fra 13 Nætter).

De Fugle, der indkom til Zoologisk Museum som faldne i 1912, vare:

1. *Anas crecca* 2.
2. *Anas penelops* 2.
3. *Anas boscas* 1.
4. *Fuligula cristata* 1.
5. *Fuligula marila* 1.
6. *Oedemia nigra* 7.
7. *Mergus serrator* 2.
8. *Anser torquatus* 3. (10 faldt.)

(1912.)

9. *Coturnix communis* 1.
10. *Colymbus septentrionalis* 1.
11. *Rallus aquaticus* 6.
12. *Gallinula chloropus* 1.
13. *Fulica atra* 1.
14. *Vanellus cristatus* 3.
15. *Charadrius squatarola* 3.
16. *Charadrius pluvialis* 3.
17. *Eudromias morinellus* 1.
18. *Ægialitis hiaticula* 3.
19. *Hæmatopus ostreologus* 1.
20. *Numenius arquatus* 2.
21. *Limosa lapponica* 1.
22. *Actitis hypoleuca* 7.
23. *Totanus calidris* 1.
24. *Tringa canutus* 7.
25. *Tringa alpina* 11.
26. *Phalaropus fulicarius* 1.
27. *Limnocryptes gallinula* 5.
28. *Gallinago scolopacina* 5.
29. *Gallinago major* 1.
30. *Scolopax rusticula* 1.
31. *Larus ridibundus* 1.
32. *Lestris longicauda* 1.
33. *Phalacrocorax graculus* 1.
34. *Falco tinnunculus* 1.
35. *Accipiter nisus* 1.
36. *Columba palumbus* 2.
37. *Cypselus apus* 2.
38. *Cuculus canorus* 1.
39. *Iynx torquilla* 8.
40. *Hirundo rustica* 1.
41. *Alauda arvensis* 289. (364 faldt.)
42. *Sturnus vulgaris* 121. (211 faldt.)

(1912.)

43. *Troglodytes parvulus* 1.
44. *Sylvia cinerea* 6.
45. *Sylvia atricapilla* 3.
46. *Sylvia hortensis* 9.
47. *Sylvia nisoria* 4.
48. *Hypolais icterina* 1.
49. *Acrocephalus arundinaceus* 1.
50. *Acrocephalus phragmitis* 6.
51. *Phyllopseustes trochilus* 25.
52. *Phyllopseustes rufus* 2.
53. *Regulus cristatus* 19.
54. *Anthus pratensis* 11.
55. *Anthus obscurus* 4.
56. *Turdus iliacus* 102. (192 faldt.)
57. *Turdus musicus* 64. (90 faldt.)
58. *Turdus viscivorus* 3.
59. *Turdus pilaris* 21. (23 faldt.)
60. *Turdus torquatus* 1.
61. *Turdus merula* 69. (71 faldt.)
62. *Saxicola oenanthe* 6.
63. *Praticola rubetra* 4.
64. *Ruticilla phoenicura* 14.
65. *Erithacus rubecula* 46.
66. *Luscinia philomela* 2.
67. *Muscicapa atricapilla* 36.
68. *Muscicapa grisola* 1.
69. *Fringilla coelebs* 6.
70. *Fringilla montifringilla* 8.
71. *Coccothraustes vulgaris* 1.
72. *Ligurinus chloris* 1.
73. *Cannabina linota* 1.
74. *Emberiza schoeniclus* 1.
75. *Emberiza citrinella* 1.
76. *Emberiza nivalis* 17. (18 faldt.)

(1912.)

Af de faldne Arter vare tre, nemlig *Phalaropus fulicarius*, *Gallinago major* og *Lestris longicauda*, ikke faldne ved Fyrene i Løbet af de foregaaende 26 Aar. Tallet paa de Arter, der ere faldne i Løbet af de sidste 27 Aar, er dermed naaet op til 164[1]).

Fortegnelse over de Fugle der ere indsendte fra Fyrene som faldne om Natten.

(Hver Nat henregnes til den følgende Dag.)

1. *Anas crecca.* Krikand.
   September: 15de Skagen 1 ♂ jun.
   Oktober: 6te Rubjerg Knude 1.
2. *Anas penelops.* Pibeand.
   Oktober: 6te Rubjerg Knude 1.
   22de Lyngvig 1 jun.
3. *Anas boscas.* Stokand.
   November: 19de Kjels Nor 1 ♀.
4. *Fuligula cristata.* Troldand.
   Februar: 20de Hov 1 ♀.
5. *Fuligula marila.* Bjergand.
   Januar: 13de Rubjerg Knude 1 ♀.
6. *Oedemia nigra.* Sortand.
   Februar: 13de Vyl 2 (♂ ad., ♀).
   September: 11te Hals Barre 1 ♀ ad.
   Oktober: 7de Skagen 1 ♀ jun.
   November: 5te Blaavands Huk 1 ♂ jun.
   9de Læsø Rende 1 ♀ ad.
   December: 5te Skagen 1 ♂ ad.
7. *Mergus serrator.* Toppet Skallesluger.
   Februar: 26de Lyngvig 1 ♂ ad.
   Oktober: 7de Lyngvig 1 ♂ jun.

---

[1]) Ved en Fejltagelse er dette Tal for Aaret 1911 angivet til 159, det skulde have været 161.

(1912.)

8. *Anser torquatus.* Knortegaas.

Februar: 12te Lyngvig 1 (7 faldt), Lodbjerg 1.

Oktober: 5te Hammeren 1.

9. *Coturnix communis.* Vagtel.

Oktober: 13de Kjels Nor 1.

10. *Colymbus septentrionalis.* Rødstrubet Lom.

Februar: 17de Vestborg 1 ♂ ad.

11. *Rallus aquaticus.* Vandrikse.

April: 5te Skagen 1 ♂ ad., Sprogø 1 ♂ ad.
7de Kjels Nor 1 ♀ ad.

Oktober: 14de Hals Barre 1 ♀ ad.
16de Læsø Rende 1 ♀ ad.

November: 8de Blaavands Huk 1 ♂.

12. *Gallinula chloropus.* Rørhøne.

November: 18de Kjels Nor 1 ♀.

13. *Fulica atra.* Blishøne.

Oktober: 6te Lodbjerg 1.

14. *Vanellus cristatus.* Vibe.

Marts: 18de Lodbjerg 1 ♀ ad., Sejrø 1 ♀ ad.

Oktober: 15de Lodbjerg 1 ♀ ad.

15. *Charadrius squatarola.* Strandhjejle.

August: 20de Schultz's Grund 1 ♂ ad.
22de Fornæs 1.

September: 14de Lodbjerg 1.

16. *Charadrius pluvialis.* Hjejle.

Marts: 15de Lyngvig 1 ♂ ad.

August: 20de Skagen 1 ♀ ad.

September: 11te Lyngvig 1.

17. *Eudromias morinellus.* Pomeransfugl.

Maj: 19de Lyngvig 1 ♀.

18. *Ægialitis hiaticula.* Præstekrave.

Marts: 11te Skagen 1 ♂.
20de Lodbjerg 1 ♂.

April: 27de Vestborg 1.

19. *Hæmatopus ostreologus.* Strandskade.
Marts: 16de Lyngvig 1.

20. *Numenius arquatus.* Storspove.
Marts: 17de Lodbjerg 1.
August: 20de Lyngvig 1.

21. *Limosa lapponica.* Kobbersneppe.
August: 20de Lyngvig 1 ♀.

22. *Actitis hypoleuca.* Mudderklire.
August: 10de Skagen 1 ♂ jun.
17de Skagen 1.
18de Lodbjerg 1 ♂, Hanstholm 1.
19de Lyngvig 1.
20de Lyngvig 1.
22de Skagen 1.

23. *Totanus calidris.* Rødben.
August: 19de Lodbjerg 1 ♂ jun.

24. *Tringa canutus.* Islandsk Ryle.
August: 16de Lyngvig 1 jun.
18de Hanstholm 1 ad.
19de Hanstholm 1 ♀ jun.
20de Lodbjerg 1 ♀ jun., Skagen 2 ♀ jun.
22de Fornæs 1 ♂ ad.

25. *Tringa alpina.* Ryle.
Januar: 26de Lyngvig 1.
Marts: 17de Graadyb 1 ♀ ad.
20de Lodbjerg 3 (2 ♂, 1 ♀ jun.).
August: 13de Lodbjerg 1 ♂ jun.
September: 11te Lyngvig 1 ♀ jun.
14de Gedser 1 ♂ jun.
Oktober: 13de Lyngvig 1 ♀ jun.
November: 8de Blaavands Huk 1 ♂ jun.
December: 27de Lyngvig 1 ♀ jun.

26. *Phalaropus fulicarius.* Thorshane.
Oktober: 19de Skagen 1 ♀ jun.

(1912.)

27. *Limnocryptes gallinula.* Enkelt Bekkasin.
September: 22de Lyngvig 1.
Oktober: 13de Kjels Nor 1.
19de Læsø Rende 1 ♂.
November: 17de Lyngvig 1 ♂.
December: 11te Sejrø 1 ♂.

28. *Gallinago scolopacina.* Horsegøg.
Marts: 19de Lodbjerg 1 ♂ ad.
Oktober: 13de Læsø Rende 1 ♂.
16de Lyngvig 1 ♂ jun.
22de Lodbjerg 1 ♀ jun.
31te Lyngvig 1 ♂.

29. *Gallinago major.* Tredækker.
August: 25de Skagen 1 ♂.

30. *Scolopax rusticula.* Skovsneppe.
Marts: 18de Stevns 1 ♂ ad.

31. *Larus ridibundus.* Hættemaage.
August: 20de Lyngvig 1,

32. *Lestris longicauda.* Lille Kjove.
September: 11te Vestborg 1 ♂ jun.

33. *Phalacrocorax graculus.* Topskarv.
November: 10de Skagens Rev 1 ♀ jun.

34. *Falco tinnunculus.* Taarnfalk.
December: 4de Graadyb 1 ♀ ad.

35. *Accipiter nisus.* Spurvehøg.
Oktober: 5te Vyl 1 ♂ jun.

36. *Columba palumbus.* Ringdue.
November: 27de Kjels Nor 1.
December: 9de Kjels Nor 1.

37. *Cypselus apus.* Mursejler.
August: 10de Skagen 1 ♀ jun.
27de Anholt Knob 1 jun.

38. *Cuculus canorus.* Gøg.
Maj: 16de Gedser Rev 1 ♀ ad.

(1912.)

39. *Iynx torquilla.* Vendehals.

Maj: 7de Lyngvig 1 ♀.

9de Fornæs 1 ♀.

August: 19de Hammeren 2 (♂, ♀ jun.).

20de Skagen 1 ♂ ad., Nordre Rønner 1 ♀ jun., Nakkehoved 1 ♂ jun.

24de Lodbjerg 1 ♂.

40. *Hirundo rustica.* Landsvale.

Maj: 10de Vyl 1.

41. *Alauda arvensis.* Lærke.

Februar: 10de Vyl 2 ♂.

11te Vyl 4 ♂ (20 faldt), Horns Rev 15 (14 ♂, 1 ♀ ad.; mange faldt).

12te Vyl 3 ♂.

15de Vyl 1 ♂.

17de Horns Rev 10 ♂.

18de Vyl 3 (2 ♂, 1 ♀ ad.), Lyngvig 1 ♂ (3 faldt), Hov 1 ♂, Kjels Nor 60.

19de Lodbjerg 3 (2 ♂, 1 ♀ ad.), Østre Flak 1 ♀.

20de Graadyb 4 (3 ♂, 1 ♀ jun.), Hov 1 ♀ ad.

21de Lodbjerg 1 ♀ ad.

22de Graadyb 2 ♂, Vyl 3 ♂, Vestborg 2 (♂, ♀ ad.).

24de Anholt Knob 1 ♀ jun., Thunø 1 ♂.

26de Læsø Trindel 5 (3 ♂, 2 ♀ jun.), Anholt Knob 2 (♂, ♀).

27de Østre Flak 18 (11 ♂, 7 ♀; 20 faldt), Lappegrunden 1 ♂ ad.

28de Østre Flak 8 ♂, Anholt Knob 1 ♂.

29de Anholt Knob 1 ♀ jun.

Marts: 5te Vyl 1 ♂.

7de Drogden 1 ♀.

9de Læsø Rende 1 ♀.

10de Vyl 1 ♀, Læsø Trindel 3 (1 ♂, 2 ♀), Anholt Knob 1 ♀.

(1912.)

Marts: 11te Skagen 1 ♀, Læsø Rende 4 (2 ♂, 2 ♀), Østre Flak 2 (♂, ♀), Anholt Knob 1 ♀.
14de Østre Flak 1 ♂.
15de Vyl 2 (♂, ♀), Gedser Rev 1 ♀.
16de Graadyb 1 ♀.
17de Læsø Trindel 1 ♂.
18de Kjels Nor 1.
20de Læsø Trindel 1 ♀, Hjelm 1 ♀, Gedser 1 ♂.
21de Skagen 8 (1 ♂, 7 ♀), Læsø Rende 2 ♂, Gedser Rev 1 ♀.
22de Lodbjerg 1 ♀.
23de Østre Flak 3 ♀.
25de Vyl 3 (1 ♂, 2 ♀), Lyngvig 1 ♀.
26de Anholt Knob 1 ♀, Schultz's Grund 10 (1 ♂, 2 ♀ ad., 7 ♀ jun.).
29de Schultz's Grund 10 (3 ♂, 2 ♀ ad., 5 ♀ jun.).

April: 5te Østre Flak 1 ♀.
8de Læsø Rende 1 ♀.
16de Østre Flak 2 ♀.

September: 23de Vyl 1 ♀ ad., Østre Flak 2 ♀.

Oktober: 9de Lyngvig 1 ♀ jun.
12te Lodbjerg 1 ♂.
13de Lodbjerg 1 ♀.
14de Læsø Rende 3 (2 ♂, 1 ♀ ad.; 5 faldt), Østre Flak 5 (4 ♂, 1 ♀ ad.), Hals Barre 6 (4 ♂, 2 ♀ jun.).
16de Hals Barre 3 (1 ♂, 1 ♀ ad., 1 ♀ jun.), Anholt Knob 1 ♂.
19de Vyl 3 (1 ♀ jun., 1 ♀ ad.), Læsø Rende 1 ♀ ad., Østre Flak 1 ♂.
20de Rubjerg Knude 1 ♀ jun., Hals Barre 2 (1 ♂, 1 ♀ jun.).
21de Graadyb 1 ♀ ad., Sprogø 9 (7 ♂, 1 ♀ ad., 1 ♀ jun.), Kjels Nor 1 ♂, Gedser Rev 2 (1 ♂, 1 ♀ jun.).
22de Vyl 5 ♂ (36 faldt), Lyngvig 1 ♂ (23 faldt).

(1912.)

Oktober: 24de Vyl 1 ♂.

November: 4de Blaavands Huk 1 ♂, Horns Rev 5 (4 ♂, 1 ♀ jun.).

8de Blaavands Huk 1 ♂.

9de Østre Flak 1 ♂.

14de Blaavands Huk 2 (♂, ♀ jun.), Vyl 1 ♀ jun.

17de Blaavands Huk 1 ♂.

42. *Sturnus vulgaris.* Stær.

Februar: 18de (Omø 1.)*)

19de Østre Flak 1 ♀.

22de Vyl 1 ♀ ad., (Sejrø 1).

23de Vyl 1 ♀ ad., (Nordre Rønner 1).

26de Horns Rev 1 ♂.

27de Vyl 1 ♂.

28de Graadyb 1 ♂.

29de (Østre Flak 1.)

Marts: 1ste Kjels Nor 1.

10de Skagen 1 ♂ ad., Læsø Trindel 2 ♀ ad.

12te Vyl 2 ♀ ad.

14de Graadyb 1 ♂, (Sejrø 1).

15de (Sejrø 1.)

16de Vyl 1 ♂.

17de Graadyb 3 (2 ♂ ad., 1 ♂ jun.), Vyl 5 (1 ♂ jun., 4 ♀ ad.), Horns Rev 5 (1 ♂ ad., 4 ♀ ad.), (Møen 1).

18de Østre Flak 1 ♂, (Hesselø 1, Sejrø 1), Kjels Nor 45, Gedser 2 ♀ ad., Gedser Rev 1 ♂.

19de (Omø 3.)

20de Lodbjerg 1 ♂, Hjelm 1 ♂.

21de Østre Flak 1 ♂, (Hammeren 1).

22de Anholt Knob 1 ♂ (6 faldt), (Sejrø 3).

---

*) I Klammer er, efter Fyrmestrenes Oplysninger, vedføjet Tallet paa de faldne Fugle, naar dette er et andet end Tallet paa de indsendte; paa samme Maade vedføjes efter Fyrmestrenes Opgivelser Stære, selv om intet er indsendt.

1912.)

Marts: 24de Skagen 1 ♂.

25de Vyl 1 ♂, Horns Rev 2 ♂, Lyngvig 1 ♀ jun. (5 faldt), (Møen 5).

26de Skagen 1 ♂, (Hals Barre 1), Anholt Knob 1 ♀ ad. (3 faldt), Schultz's Grund 1 ♂, Hov 1 ♂, (Møen 3).

27de Lyngvig 1 ♀ jun., Hov 1 ♂, Gedser Rev 1 ♀ ad.

29de Schultz's Grund 1 ♀ ad.

Oktober: 13de (Skagen 1.)

15de Gedser Rev 1 ♀ jun.

19de Vyl 1 ♂ jun., Lyngvig 1 ♂ (4 faldt), Skagen 1 ♀ jun.

20de Graadyb 1 ♀ jun., Rubjerg Knude 1 ♂ ad.

21de Graadyb 1 ♀ jun., (Blaavands Huk 10), Vyl 1 ♂, Lyngvig 1 ♂ ad. (2 faldt), Lodbjerg 1 ♂, (Sejrø 1, Sprogø 1), Kjels Nor 2.

22de (Blaavands Huk 10), Vyl 2 (1 ♂ ad., 1 ♀ ad.; 12 faldt), (Omø 2).

23de (Blaavands Huk 8), Vyl 2 (1 ♂ ad., 1 ♀ ad.), (Omø 3).

24de Vyl 1 ♀ ad.

25de Vyl 2 (1 ♂, 1 ♀ jun.).

26de (Sprogø 1.)

28de (Hesselø 2.)

31te Blaavands Huk 1 ♀ ad.

November: 1ste (Sprogø 1.)

4de Horns Rev 5 (2 ♂, 2 ♀ ad., 1 ♀ jun.).

8de Blaavands Huk 2 ♂.

10de Vyl 1 ♀ ad.

43. *Troglodytes parvulus.* Gærdesmutte.

Oktober: 16de Hals Barre 1.

44. *Sylvia cinerea.* Tornsanger.

August: 17de Skagen 1.

18de Hanstholm 1.

August: 20de Lodbjerg 1 ♂.
September: 11te Vyl 1, Lyngvig 2 (1 ♂ ad., 1 ♀ jun.).

45. *Sylvia atricapilla.* Munk.
September: 13de Lodbjerg 1 ♂.
Oktober: 12te Rubjerg Knude 1 ♀ ad.
13de Østre Flak 1 ♀.

46. *Sylvia hortensis.* Havesanger.
August: 17de Skagen 2.
18de Lodbjerg 1.
20de Nakkehoved 1 ♀ jun.
22de Hanstholm 3.
September: 11te Lodbjerg 1 ♂.
14de Lodbjerg 1 ♂.

47. *Sylvia nisoria.* Høgesanger.
August: 18de Lodbjerg 1 ♂ jun.
19de Lyngvig 1, Lodbjerg 1 ♀ jun.
20de Lyngvig 1 ♀ jun.

48. *Hypolais icterina.* Gulbug.
August: 10de Skagen 1 ♂.

49. *Acrocephalus arundinaceus.* Rørsanger.
August: 19de Hammeren 1 ♂.

50. *Acrocephalus phragmitis.* Sivsanger.
Maj: 8de Lyngvig 1.
16de Gedser Rev 1 ♀ ad.
August: 16de Vestborg 1.
19de Lyngvig 1, Hammeren 1.
20de Lodbjerg 1 ♂.

51. *Phyllopseustes trochilus.* Løvsanger.
Maj: 7de Lyngvig 1.
12te Lappegrunden 1.
August: 17de Skagen 4.
18de Hanstholm 3.
19de Hammeren 1.
22de Hanstholm 12.

(1912.)

August: 24de Lodbjerg 1 ♂ ad.
27de Læsø Trindel 1.
29de Læsø Trindel 1.

52. *Phyllopseustes rufus.* Gransanger.

Oktober: 13de Læsø Rende 1.
16de Lodbjerg 1 ♂.

53. *Regulus cristatus.* Fuglekonge.

April: 4de Læsø Rende 1 ♂.
Maj: 8de Østre Flak 1 ♀.
Oktober: 13de Læsø Trindel 2 ♂, Læsø Rende 1 ♀.
14de Hals Barre 1 ♂.
15de Læsø Rende 1 ♀.
16de Hals Barre 2 ♂.
18de Læsø Trindel 3 ♂.
19de Skagen 1 ♂, Læsø Rende 1 ♂, Nakkehoved 1 ♂.
21de Gedser Rev 3 (2 ♂, 1 ♀).
23de Nakkehoved 1 ♂.

54. *Anthus pratensis.* Engpiber.

Marts: 16de Graadyb 1 ♀ ad.
21de Vyl 1 ♂.
September: 26de Vyl 1 ♀ ad.
Oktober: 2den Graadyb 1, Vyl 1 ♀ jun.
4de Graadyb 2.
10de Vyl 1.
12te Vyl 1.
13de Graadyb 1, Horns Rev 1.

55. *Anthus obscurus.* Skærpiber.

Marts: 25de Horns Rev 3.
Oktober: 13de Graadyb 1.

56. *Turdus iliacus.* Vindrossel.

Marts: 20de Gedser 1 ♂.
25de Horns Rev 1.
Oktober: 6te Graadyb 1, Skagen 1 ♀ jun.
8de Lyngvig 1 ♂ jun. (20 faldt).

(1912.)

Oktober: 11te Lyngvig 1 ♂.
12te Lyngvig 1 ♀ jun. (3 faldt), Rubjerg Knude 1 ♂, Hals Barre 4 (3 ♂).
13de Horns Rev 2 (1 ♀ ad., 1 ♀ jun.), Lyngvig 1 ♀ jun., Kjels Nor 1.
14de Læsø Rende 2 ♀ ad., Hals Barre 2 ♂, Anholt Knob 1.
16de Horns Rev 1 ♂ jun., Lyngvig 1 ♂ (105 faldt), Lodbjerg 1 ♂ jun., Østre Flak 1 ♀ jun.
17de Gedser Rev 1 ♂.
18de Læsø Trindel 2 ♀ jun.
19de Læsø Rende 2 (♂, ♀ ad.), Østre Flak 2 (♀ ad., ♀ jun.).
20de Rubjerg Knude 2 (♂, ♀ jun.), Hals Barre 1 ♀ jun.
21de Graadyb 2 (♂, ♀ jun.), Sprogø 11, Hov 1 ♂, Kjels Nor 30.
22de Vyl 1 ♂ (c. 10 faldt), Lyngvig 1 ♀ ad. (58 faldt), Lodbjerg 2 ♀ jun.
24de Gedser Rev 1 ♀ jun.
29de Blaavands Huk 1 ♂.
30te Blaavands Huk 6 (4 ♂, 2 ♀ jun.).
31te Blaavands Huk 1 ♀ ad., Østre Flak 1 ♂.

November: 4de Blaavands Huk 1 ♂, Horns Rev 1 ♂.
5te Blaavands Huk 6 (2 ♂, 4 ♀ jun.).
15de Lyngvig 1 (2 faldt).

57. *Turdus musicus.* Sangdrossel.

Marts: 16de Graadyb 2 ♂, Vyl 1 ♂.
17de Graadyb 1 ♂, Horns Rev 2 ♂
18de Kjels Nor 7.
20de Hjelm 1 ♂.
25de Horns Rev 1.

April: 5te Lodbjerg 1 ♂.

Maj: 3dje Vestborg 1 ♀.
7de Lyngvig 1.

(1912.)

September: 13de Lyngvig 1 ♂ jun.
23de Vyl 1 ♂.

Oktober: 12te Hals Barre 1 ♀ jun.
13de Graadyb 1 ♂, Horns Rev 1 ♂ jun., Læsø Rende 1 ♂ jun.
14de Læsø Rende 2 (♀ ad., ♀ jun.), Hals Barre 1 ♂.
15de Læsø Trindel 1 ♂.
16de Lodbjerg 1 ♂, Gedser Rev 1 ♀ ad.
19de Læsø Rende 1 ♀ jun., Østre Flak 1 ♂.
21de Graadyb 3 (2 ♂, 1 ♀ jun.), Sprogø 4, Kjels Nor 11.
22de Vyl 4 (3 ♂, 1 ♀ jun.; c. 30 faldt), Lodbjerg 1 ♀ ad.
24de Gedser Rev 1 ♂.
29de Blaavands Huk 1 ♂.
30te Blaavands Huk 1 ♀ jun.

November: 4de Horns Rev 4 (1 ♂, 1 ♀ ad., 2 ♀ jun.).
5te Blaavands Huk 2 (1 ♂, 1 ♀ jun.).

58. *Turdus viscivorus.* Misteldrossel.

Marts: 11te Skagen 1.
26de Læsø Trindel 1 ♂, Schultz's Grund 1 ♀ jun.

59. *Turdus pilaris.* Sjagger.

Marts: 16de Vyl 2 (1 ♂, 1 ♀ ad.).
20de Gedser Rev 1 ♀ jun.

Maj: 3dje Anholt Knob 1 ♂.
7de Lyngvig 1, Østre Flak 3.

Oktober: 31te Østre Flak 2.

November: 1ste Hals Barre 2 (1 ♂, 1 ♀ jun.), Anholt Knob 1 ♂.
5te Vyl 1 ♂, Lyngvig 1 ♀ jun. (3 faldt).
9de Østre Flak 2 (1 ♂, 1 ♀ ad.).
12te Østre Flak 1 ♂.
14de Sejrø 2 (1 ♀ ad., 1 ♀ jun.).
18de Blaavands Huk 1 ♀ jun.

60. *Turdus torquatus.* Ringdrossel.

September: 11te Lodbjerg 1 ♀ ad.

(1912.)

61. *Turdus merula.* Solsort.

Februar: 22de Graadyb 1 ♂ ad.

26de Vyl 1 ♂ ad., Horns Rev 2 ♂ ad., Drogden 1 ♀ ad.

28de Graadyb 1 ♂ ad., Vyl 2 (1 ♂ ad., 1 ♀ jun.).

29de Vyl 2 ♂ ad.

Marts: 1ste Kjels Nor 1 ♂ ad.

7de Læsø Trindel 1 ♀ jun.

10de Læsø Rende 1 ♂ ad.

16de Vyl 2 ♀ jun.

17de Graadyb 5 (3 ♂, 2 ♀), Vyl 3 (2 ♂ ad., 1 ♀ jun.), Horns Rev 1 ♀ ad.

18de Østre Flak 1 ♂ ad., Kjels Nor 3.

20de Østre Flak 2 ♂, Hjelm 1 ♀.

21de Skagen 1 ♂, Læsø Rende 3 (2 ♂, 1 ♀), Østre Flak 1 ♂.

22de Anholt Knob 1 ♂ ad. (3 faldt).

23de Skagen 1 ♂, Læsø Trindel 7 (4 ♂, 3 ♀), Østre Flak 1 ♀.

25de Vyl 1 ♀, Horns Rev 5 (3 ♂, 2 ♀).

26de Læsø Trindel 1 ♂, Anholt Knob 1 ♂ Schultz's Grund 2 ♀.

29de Schultz's Grund 2 (1 ♂, 1 ♀).

April: 5te Østre Flak 1 ♂.

10de Læsø Rende 1 ♀.

Oktober: 18de Læsø Trindel 1 ♂ ad.

19de Læsø Rende 1 ♂ ad., Østre Flak 1 ♂ ad.

November: 5te Bovbjerg 1 ♂ ad.

8de Skagens Rev 1 ♂ ad.

17de Vyl 2 (1 ♂ ad., 1 ♀ jun.), Lyngvig 1 ♀ ad.

18de Lyngvig 1 ♂ ad.

62. *Saxicola oenanthe.* Stenpikker.

Maj: 3dje Vestborg 1 ♂.

7de Lodbjerg 1 ♀.

(1912.)

August: 20de Schultz's Grund 1 ♂ jun.
September: 11te Vyl 1 ♂, Lyngvig 1 ♀ jun.
23de Østre Flak 1.

63. *Praticola rubetra.* Bynkefugl.
Maj: 9de Vyl 2 (1 ♂, 1 ♀).
16de Gedser Rev 1 ♂ ad.
August: 22de Hanstholm 1 ♀ jun.

64. *Ruticilla phoenicura.* Rødstjert.
Maj: 3dje Vestborg 1 ♂.
7de Lodbjerg 1 ♂.
8de Lyngvig 1 ♂.
10de Lappegrunden 1 ♀.
12te Lappegrunden 1 ♀.
16de Vyl 1 ♀.
August: 20de Lyngvig 2 (1 ♂, 1 ♀).
22de Hanstholm 1 ♀.
27de Læsø Trindel 1 ♂, Anholt Knob 1 ♂.
September: 11te Lyngvig 2 (1 ♂, 1 ♀ jun.), Lodbjerg 1 ♀ jun.

65. *Erithacus rubecula.* Rødkælk.
Marts: 22de Læsø Trindel 1 ♂.
26de Schultz's Grund 1.
April: 19de Vyl 2 ♂.
Maj: 7de Østre Flak 2 ♀.
8de Østre Flak 1 ♀.
18de Nakkehoved 1 ♀.
September: 12te Anholt Knob 1.
23de Østre Flak 2 jun.
Oktober: 12te Rubjerg Knude 4 (1 ♂, 3 ♀ jun.).
13de Graadyb 1 ♂, Horns Rev 1 ♀ jun., Læsø Rende 1 ♂ ad., Kjels Nor 3 jun.
14de Læsø Rende 2 (1 ♀ ad., 1 ♂ jun.).
15de Læsø Rende 2 ♂ jun., Anholt Knob 1 ♂.
17de Anholt Knob 1 ♀ ad.
18de Læsø Trindel 1 ♀ jun.

Oktober: 19de Læsø Rende 3 (1 ♂ jun., 1 ♀ ad.), Østre Flak 1 ♂, Nakkehoved 8 (1 ♂ ad., 4 ♂ jun., 3 ♀ jun.), Gedser Rev 1 ♀ ad.
20de Rubjerg Knude 1 ♀ jun., Hals Barre 2 ♀ jun.
21de Gedser Rev 2 (1 ♂ jun., 1 ♀ jun.).

66. *Luscinia philomela.* Nattergal.
Maj: 16de Gedser Rev 2 ♂.

67. *Muscicapa atricapilla.* Broget Fluesnapper.
Maj: 7de Lodbjerg 2 ♂.
18de Nakkehoved 1 ♀.
August: 13de Lodbjerg 1 ♀ jun.
17de Skagen 1.
18de Lodbjerg 2, Hanstholm 8.
19de Hammeren 1.
20de Lyngvig 1.
22de Hanstholm 8.
24de Lodbjerg 5 (4 ♂ jun., 1 ♀ jun.).
27de Lodbjerg 2, Læsø Trindel 2.
September: 11te Vyl 2 (1 ♀ ad., 1 ♀ jun.).

68. *Muscicapa grisola.* Graa Fluesnapper.
September: 11te Lyngvig 1 ♀ jun.

69. *Fringilla coelebs.* Bogfinke.
Marts: 15de Anholt Knob 1 ♀.
20de Læsø Trindel 1 ♂.
22de Anholt Knob 1 ♀.
29de Schultz's Grund 1 ♂.
April: 22de Graadyb 1 ♀.
Maj: 8de Anholt Knob 1 ♀.

70. *Fringilla montifringilla.* Kvækerfinke.
April: 16de Østre Flak 1 ♂.
23de Vyl 1 ♂.
Oktober: 13de Læsø Trindel 1 ♀ jun.
16de Lyngvig 2 (1 ♂, 1 ♀), Hals Barre 1 ♀.
29de Vyl 1 ♂.

(1912.)

November: 2den Østre Flak 1 ♂ jun.

71. *Coccothraustes vulgaris.* Kernebider.

Marts: 22de Gedser Rev 1 ♂.

72. *Ligurinus chloris.* Svenske.

Oktober: 21de Gedser Rev 1 ♀ jun.

73. *Cannabina linota.* Irisk.

Marts: 18de Vyl 1 ♀.

74. *Emberiza schoeniclus.* Rørspurv.

Oktober: 15de Læsø Rende 1 ♀ ad.

75. *Emberiza citrinella.* Gulspurv.

Oktober: 4de Vyl 1.

76. *Emberiza nivalis.* Snespurv.

Marts: 9de Skagen 2 (1 ♂, 1 ♀).
10de Østre Flak 1 ♀, Anholt Knob 1 ♀.
18de Gedser Rev 1 ♀ (2 faldt).
24de Læsø Rende 1 ♀.
29de Schultz's Grund 3 (1 ♂, 2 ♀).

November: 9de Læsø Rende 2 ♀, Østre Flak 6 (1 ♂ ad., 2 ♂ jun., 1 ♀ ad., 2 ♀ jun.).

Oversigt over de Nætter da Fugle ere komne til Fyrene.

Hver Nat henregnes til den følgende Dag. — Tallet efter Vindretningen betegner Vindstyrken efter Beauforts Skala (0—12), hvor

1 betyder: Let Brise.
2 — : Laber Bramsejlskuling.
3 — : Bramsejlskuling.
4 — : Merssejlskuling.
5 — : Rebet Merssejlskuling.
6 — : Torebet Merssejlskuling.
7 betyder: Trerebet Merssejlskuling.
8 — : Klosrebet Merssejlskuling.
9 — : Undersejlskuling el. Storm.
10 — : Haard Storm.
11 — : Orkanagtig Storm.
12 — : Orkan.

12te Januar.

Nordre Rønner. S. 6. Overtr. 1 Sjagger faldt (ikke indsendt).

13de Januar.

Bovbjerg. S. Ø., 7. Skyet. Kl. 11 Nat fløj en Vildand mod Ruderne og faldt (ikke indsendt).

Rubjerg Knude. S. S. Ø. 6. En Bjergand fløj mod Ruderne og faldt.
Fuligula marila. Rubjerg Knude 1.

23de Januar.

Helnæs. Ø. 1. Taage. 3 Lærker sloge mod Lanterneruderne, deraf faldt 2 (ikke indsendte), medens den ene blev taget levende og sat paa fri Fod ved Daggry.

26de Januar.

Lyngvig. N. N. Ø. 2. Taage. En Ryle faldt.
Drogden. Vind O. Taage. Endel Lærker om Fyret.
Tringa alpina. Lyngvig 1.

9de Februar.

Læsø Trindel. Ø. 2. Taage. Fugle om Fyret; ingen faldt.

10de Februar.

Vyl. S. Ø. 2. Graat. Flere Lærker om Fyret; 2 faldt.
Møen. N. 1. Taage. En Aalesnapper fløj mod Syd-Ruden og faldt død ned (ikke indsendt).
Alauda arvensis. Vyl 2.

11te Februar.

Vyl. Ø. 2. Taage. Mange Lærker om Fyret; 20 faldt (4 indsendt). Viber hørtes.
Horns Rev. Ø. S. Ø. Regn. Omkr. 200 Lærker ved Fyret om Natten; 15 Lærker faldt paa Dækket, mange i Vandet.
Alauda arvensis. Vyl 4 (20 faldt), Horns Rev 15 (mange faldt).

12te Februar.

Vyl. Ø. S. Ø. 2. Taage. Endel Lærker og Stære ved Fyret; 3 Lærker faldt.
Lyngvig. Ø. 2. Overtr. 7 Knortegæs faldt (1 indsendt).
Lodbjerg. Ø. N. Ø. 2. Overtr., Regn og Dis. 1 Stær ved Ruderne før Midnat; 1 Knortegaas faldt.
Sprogø. N. Ø. 2. Diset. 2 Skalleslugere faldt (ikke indsendte).
Anser torquatus. Lyngvig 1 (7 faldt), Lodbjerg 1.
Alauda arvensis. Vyl 3.

(1912.)

13de Februar.

Vyl. Ø. S. Ø. 3. Skyet. Enkelte Fugle ved Fyret; 2 Sortænder faldt; Regnspover hørtes.

Lyngvig. Ø. 2. Sne. En Stær ved Lanterneruderne.

Oedemia nigra. Vyl 2.

14de Februar.

Blaavands Huk. Ø. S. Ø. 4. Graat, Snebyger. En Graaand faldt (ikke indsendt).

15de Februar.

Vyl. S. S. V. 3. Graat. Endel Fugle om Fyret; 1 Lærke faldt.

Alauda arvensis. Vyl 1.

16de Februar.

Horns Rev. S. V. Taage, Regn og Dis. Omkring 30 Lærker ved Fyret om Natten.

17de Februar.

Horns Rev. S. S. V. Taage. Omkr. 40 Lærker ved Fyret om Natten; 10 faldt paa Dækket, enkelte i Vandet.

Vestborg. En Rødstrubet Lom faldt.

Sprogø. Taage. Stære og Lærker paa Lanterneruderne.

Helnæs. V. 3. Tykning. En Stær slog mod Ruderne og fangedes levende, sattes derpaa atter i Frihed; en And, Blaaryg kaldet, slog sig ihjel mod Fyrets Lanterneruder Kl. 11^{30} Eftm. (ikke indsendt).

Colymbus septentrionalis. Vestborg 1.
Alauda arvensis. Horns Rev 10.

18de Februar.

Vyl. S. V. 2. Skyet. Mange Fugle om Fyret; 3 Lærker faldt.

Horns Rev. Vind 0, Skyet. Enkelte Lærker ved Fyret om Natten.

Lyngvig. S. S. V. 2. Taage. Stærke og Lærker ved Fyret; 3 Lærker faldt (1 indsendt).

Bovbjerg. Ø. S. Ø. 3. Taage. Om Natten saas den første Stær ved Fyret iaar.

Sprogø. Vind 0. Taage. En Lærke faldt (ikke indsendt).

(1912.)

Omø. Vind 0. Taage. En Stær faldt (ikke indsendt).

Hov. Vind 0. Tykning. En Lærke faldt.

Æbelø. S. V. 3. Taage og diset. Endel Stære og Lærker paa Ruderne; ingen faldt.

Kjels Nor. S. V. 2. Taagedis. 60 Lærker faldt.

Helnæs. S. Ø. 2. Diset. En Spidsnæb slog sig ihjel mod Lanterneruderne om Morgenen Kl. 3 (ikke indsendt).

Alauda arvensis. Vyl 3, Lyngvig 1 (3 faldt), Hov 1, Kjels Nor 60.
Sturnus vulgaris. (Omø 1.)

19de Februar.

Horns Rev. Vind 0. Taage. Enkelte Lærker ved Fyret om Natten.

Lodbjerg. Omløb. Vind. 2. Taage og Dis. En Stær og nogle Lærker ved Ruderne om Natten; 3 Lærker faldt.

Østre Flak. S. 2. Taage. En Lærke og en Stær faldt.

Hjelm. S. Ø. 2. Taage. En Stær ved Ruderne.

Sprogø. Lærker paa Lanterneruderne.

Alauda arvensis. Lodbjerg 3, Østre Flak 1.
Sturnus vulgaris. Østre Flak 1.

20de Februar.

Graadyb. S. V. 1. Diset. Smaafugle ved Fyret; 4 Lærker faldt.

Horns Rev. Ø. Regntykning. Enkelte Smaafugle ved Fyret om Natten.

Lyngvig. S. Ø. 3. Taage. Lærker, Stære og 2 Høge ved Fyret.

Lodbjerg. Ø. S. Ø. 2. Overtr., Regntykning. En Lærke ved Ruderne efter Midnat.

Sejrø. S. Ø. og Ø. S. Ø. Overtr. Endel Lærker omkring Lanternen hele Natten; 6 faldt (ikke indsendte).

Sprogø. S. 2. Overtr. En Lom faldt (ikke indsendt).

Hov. S. Ø. 2. Regn. En Troldand og en Lærke faldt.

Fuligula cristata. Hov 1.
Alauda arvensis. Graadyb 4, Hov 1.

21de Februar.

Graadyb. Ø. 1. Smaafugle ved Fyret.

(1912.)

Lodbjerg. Ø. 2. Overtr., Taage. 2 Lærker og 1 Stær ved Ruderne før Midnat; 1 Stær faldt.

Læsø Rende. Ø. S. Ø. 2. Regntykning. Mange Lærker omkring Fyret; 3 faldt (ikke indsendte).

Hjelm. Omløb. Vind. 2. Dis. Flere Stære og Lærker ved Ruderne; ingen faldt.

Sejrø. Ø. S. Ø. Diset og overtr. Store Sværme Lærker omkring Lanternen; 42 faldt (ikke indsendte).

Omø. Ø. S. Ø. 2. Overtr. En Ederfugl (Han) faldt (ikke indsendt).

Sturnus vulgaris Lodbjerg 1.

22de Februar.

Graadyb. S. Ø. 2. Taage. 2 Lærker og 1 Solsort faldt.

Vyl. S. Ø. 2. Graat. Endel Lærker og Stære ved Fyret; 3 Lærker og 1 Stær faldt.

Lodbjerg. S. 2. Overtr., Taage. Nogle Stære ved Ruderne efter Midnat.

Sejrø. S. Diset og Taage. Enkelte Stære og Lærker ved Fyret; 1 Stær og 2 Lærker faldt (ikke indsendte).

Vestborg. S. V. 2. Tykning. Mange Smaafugle paa Ruderne; 2 Lærker faldt.

Helnæs. Beltet fuldt af Is. En Buskand slog sig ihjel mod Lanterneruderne Kl. 1^{15} Morgen (ikke indsendt).

Alauda arvensis. Graadyb 2, Vyl 3, Vestborg 2.
Sturnus vulgaris. Vyl 1, (Sejrø 1.)
Turdus merula. Graadyb 1.

23de Februar.

Graadyb. S. 2. Smaafugle ved Fyret.

Vyl. S. V. 2. Taage. En Stær faldt.

Lodbjerg. S. Ø. 4. Overtr. Regn og Dis. En Stær ved Ruderne før Midnat, 2 efter Midnat; om Morgenen V. S. V. 4. Skyet og Dis. Mange Stære og 1 Lærke ved Ruderne.

Nordre Rønner. Ø. S. Ø. 7. Overtr. 1 Drossel og 1 Stær faldt (ikke indsendte).

(1912.)

Hjelm. V. 2. Taage. 2 Viber saas i Straalerne.

Sturnus vulgaris. Vyl 1 (Nordre Rønner 1.)

24de Februar.

Læsø Rende. S. 4. Regntaage. 1 Lærke faldt (ikke indsendt).

Anholt Knob. S. Ø. 4. Regn og Taage. Nogle Lærker ved Fyret; 1 faldt.

Thunø. S. 3. Tykning. 1 Lærke faldt.

Æbelø. V. 2. Taage. Endel Stære og Lærker paa Ruderne; ingen faldt.

Alauda arvensis. Anholt Knob 1, Thunø 1.

25de Februar.

Lodbjerg. S. V. 2. Taage. Mange Stære og 1 Lærke ved Ruderne om Morgenen.

Skagen. N. N. V. 2. Overtr. En Stær ved Ruderne.

Anholt Knob. N. V. 3. Overtr. Nogle Smaafugle ved Fyret.

Omø. Ø. S. Ø. 2. Overtr. 2 Ederfugle faldt (ikke indsendte).

26de Februar.

Blaavands Huk. S. Ø. 4. Taage og Regn. 1 Drossel faldt (ikke indsendt).

Vyl. S. V. 2. Graat. 1 Solsort faldt.

Horns Rev. S. S. V. Graat og Taage. Omkr. 150 Fugle ved Fyret om Natten, deriblandt Viber, Stære, Solsorter, Raager og enkelte Lærker; 1 Stær og 2 Solsorter faldt.

Lyngvig. S. S. V. 3. Taage. En Toppet Skallesluger faldt.

Lodbjerg. S. S. V. 4. Overtr. Dis. Nogle Stære ved Ruderne efter Midnat.

Læsø Trindel. S. V. 3. Regn og Taage. Fugle om Fyret; 5 Lærker faldt.

Anholt Knob. S. S. V. 3. Taage. Enkelte Lærker og Stære ved Fyret; 2 Lærker faldt.

Vestborg. S. V. Taage. Mange Stære paa Ruderne.

Drogden. S. V. Diset. 1 Solsort faldt.

(1912.)

Mergus serrator. Lyngvig 1.
Alauda arvensis. Læsø Trindel 5, Anholt Knob 2.
Sturnus vulgaris. Horns Rev 1.
Turdus merula. Vyl 1, Horns Rev 2, Drogden 1.

27de Februar.

Vyl. V. 3. Skyet. Enkelte Fugle ved Fyret; 1 Stær faldt.

Skagen. S. V. 3. Regn. En Lærke faldt (ikke indsendt).

Læsø Rende. S. V. 3. Regntaage. Mange Lærker omkring Fyret; 18 faldt (ikke indsendte).

Østre Flak. S. V. til V. 2. Taage. Mange Lærker ved Fyret; 20 faldt.

Anholt Knob. S. V. 3. Taage. Flere Lærker ved Fyret; 2 faldt (ikke indsendte).

Hjelm. V. S. V. 4. Taage, En Stær ved Ruderne.

Lappegrunden. V. S. V. Diset. Nogle Stære og Lærker ved Fyret; 1 Lærke faldt.

Sprogø. V. S. V. 3. Taage. 2 Lærker faldt (ikke indsendte).

Alauda arvensis. Østre Flak 18 (20 faldt), Lappegrund 1.
Sturnus vulgaris. Vyl 1.

28de Februar.

Graadyb. S. S. V. Regn. Smaafugle ved Fyret; 1 Stær og 1 Solsort faldt.

Vyl. S. V. 4. Regn. Enkelte Fugle ved Fyret; 2 Solsorter faldt.

Lodbjerg. V. S. V. 3. Regn og Dis. Nogle Stære ved Ruderne efter Midnat.

Østre Flak. S. til V. 3. Overtr. Regn. 8 Lærker faldt.

Anholt Knob. V. 3. Regn. Flere Lærker ved Fyret; 1 faldt.

Vestborg. S. V. 2. Taage. Mange Smaafugle, særlig Stære, paa Ruderne hele Natten.

Alauda arvensis. Østre Flak 8, Anholt Knob 1.
Sturnus vulgaris. Graadyb 1.
Turdus merula. Graadyb 1, Vyl 2.

29de Februar.

Graadyb. S. Taage. Smaafugle ved Fyret.

Vyl. S. S. V. 3. Taage. Enkelte Fugle om Fyret; 2 Solsorter faldt.

(1912.)

Lodbjerg. S. S. V. 4. Overtr. Taage. 4 Stære ved Ruderne efter Midnat.

Østre Flak. S. 2. Taage. En Lærke og 1 Stær faldt (ikke indsendte).

Anholt Knob. S. V. 2. Diset. Flere Lærker ved Fyret; 1 faldt.

Drogden. S. 3. Taage. Endel Fugle om Fyret.

Sprogø. Mange Stære paa Lanterneruderne.

Alauda arvensis. Anholt Knob 1.
Sturnus vulgaris. (Østre Flak 1.)
Turdus merula. Vyl 2.

1ste Marts.

Kjels Nor. S. V. 2. Regndis, senere Taage. 1 Solsort og 1 Stær faldt.

Sturnus vulgaris 1.
Turdus merula 1.

2den Marts.

Gedser Rev. S. Ø. 3. Taage. 5 Lærker ved Fyret.

5te Marts.

Vyl. S. S. V. 4. Regn. Enkelte Lærker ved Fyret; 1 faldt.

Alauda arvensis 1.

7de Marts.

Blaavands Huk. V. 3. Graat og diset. En Graaand faldt (ikke indsendt).

Læsø Trindel. V. 4. Skyet. Fugle om Fyret; 1 Solsort faldt.

Hjelm. V. S. V. 3. Taage. Endel Stære og Drosler ved Ruderne.

Drogden. S. V. 3. Regntykning. 1 Lærke faldt.

Alauda arvensis. Drogden 1.
Turdus merula. Læsø Trindel 1.

8de Marts.

Skagen. V. N. V. 3. Skyet. 2 Lærker paa Ruderne.

Skagens Rev. S. Ø. 3. Taage. 3 Lærker ved Fyret.

9de Marts.

Hanstholm. S. S. Ø. 2. Taage. Enkelte Viber flagrede om Fyret fra Kl. 12 til Kl. 5 Form.

(1912.)

Skagen. S. 3. Overtr. En Stær (ikke indsendt) og 2 Snespurve faldt.

Læsø Rende. S. 3. Overtr. En Lærke faldt.

Alauda arvensis. Læsø Rende 1.
Sturnus vulgaris. (Skagen 1.)
Emberiza nivalis. Skagen 2.

10de Marts.

Vyl. S. Ø. 2. Skyet. 1 Lærke faldt.

Lodbjerg. S. Ø. 2. Overtr. Dis. 1 Stær ved Ruderne før Midnat.

Hanstholm. S. Ø. 2. Overtr. Nogle Viber, Hjejler, Solsorter og 1 Ringdue om Fyret før Midnat fra Kl. 10 til Kl. 12.

Skagen. S. S. Ø. 3. Diset. Flere Stære paa Ruderne; 1 Lærke (ikke indsendt) og 1 Stær faldt.

Læsø Trindel. Ø. S. Ø. 3. Overtr. Fugle om Fyret; 3 Lærker og 2 Stære faldt.

Læsø Rende. S. Ø. 3. Overtr. 1 Solsort faldt.

Østre Flak. S. S. Ø. 2. Skyet. 1 Snespurv faldt.

Anholt Knob. S. S. V. 3. Overtr. Mange Smaafugle ved Fyret; 1 Lærke og 1 Snespurv faldt.

Omø. S. Ø. Klart. Dis. 1 Skovsneppe faldt (ikke indsendt).

Alauda arvensis. Vyl 1, Læsø Trindel 3, Anholt Knob 1.
Sturnus vulgaris. Skagen 1, Læsø Trindel 2.
Turdus merula. Læsø Rende 1.
Emberiza nivalis. Østre Flak 1, Anholt Knob 1.

11te Marts.

Skagen. S. Ø. 3. Diset. 1 Præstekrave, 1 Lærke og 1 Misteldrossel faldt.

Læsø Rende. S. Ø. 3. Overtr. 4 Lærker faldt.

Østre Flak. S. Ø. 3. Overtr. 2 Lærker faldt.

Anholt Knob. Ø. S. Ø. 4. Overtr. Flere Lærker ved Fyret; 1 faldt.

Ægialitis hiaticula. Skagen 1.
Alauda arvensis. Skagen 1, Læsø Rende 4, Østre Flak 2, Anholt Knob 1.
Turdus viscivorus. Skagen 1.

12te Marts.

Vyl. S. Ø. 2. Skyet. Enkelte Fugle om Fyret; 2 Stære faldt.

Sturnus vulgaris 2.

13de Marts.

Skagen. S. 3. Dis. Flere Stære paa Ruderne.

14de Marts.

Graadyb. S. 2. Taage. Smaafugle ved Fyret; 1 Stær faldt.

Østre Flak. S. S. Ø. 3. Regn; 1 Lærke faldt.

Sejrø. S. og S. S. Ø. Diset og Regntykning. Enkelte Stære og Lærker ved Lanternen; 1 Stær og 2 Lærker faldt (ikke indsendte).

Vestborg. S. Ø. Taage og Tykning. Mange Smaafugle, særlig Stære, paa Ruderne.

Alauda arvensis. Østre Flak 1.
Sturnus vulgaris. Graadyb 1, (Sejrø 1).

15de Marts.

Graadyb. S. S. Ø. 2. Taage. Smaafugle og Stære ved Fyret.

Vyl. S. Ø. 2. Taage. 2 Lærker faldt.

Horns Rev. S. Taage. Omkr. 50 Lærker og enkelte Stære ved Fyret om Natten; ved Daggry fløj de bort mod Ø.

Lyngvig. S. S. Ø. 2. Taage. En Hjejle faldt.

Lodbjerg. S. Ø. 3. Overtr. Dis. En Drossel ved Ruderne efter Midnat.

Anholt Knob. S. Ø. 6. Overtr. En Bogfinke faldt.

Sejrø. S. S. Ø. Diset og overtr. Nogle Stære, Lærker og enkelte Vindrosler ved Lanternen; 1 Stær og 1 Vindrossel faldt (ikke indsendte).

Gedser Rev. Ø. S. Ø. 3. Taage. 2 Lærker ved Fyret; 1 faldt.

Charadrius pluvialis. Lyngvig 1.
Alauda arvensis. Vyl 2, Gedser Rev 1.
Sturnus vulgaris. (Sejrø 1.)
Fringilla coelebs. Anholt Knob 1.

16de Marts.

Graadyb. S. Ø. 5. Regn. Regnspover, Krager, Viber og Smaafugle ved Fyret; 1 Lærke, 1 Engpiber og 2 Sangdrosler faldt.

Vyl. S. Ø. 5. Regn. 1 Stær, 1 Sangdrossel, 2 Sjaggere og 2 Solsorter faldt; en Bogfinke fløj mod Lønningen og faldt i Vandet.

(1912.)

Lyngvig. S. Ø. 7. Overtr. En Strandskade faldt.

Omø. Ø. S. Ø. Overtr. 1 Solsort faldt (ikke indsendt).

Hæmatopus ostreologus. Lyngvig 1.
Alauda arvensis. Graadyb 1.
Sturnus vulgaris. Vyl 1.
Anthus pratensis. Graadyb 1.
Turdus musicus. Graadyb 2, Vyl 1.
Turdus pilaris. Vyl 2.
Turdus merula. Vyl 2.

17de Marts.

Graadyb. S. Ø. 3. Diset. Krager, Viber, Strandskader og Smaafugle ved Fyret; 1 Ryle, 3 Stære, 1 Sangdrossel og 5 Solsorter faldt.

Vyl. S. Ø. 4. Graat. 5 Stære og 3 Solsorter faldt.

Horns Rev. S. S. Ø. Graat. Flere forskellige Fugle ved Fyret om Natten; 5 Stære, 2 Sangdrosler og 1 Solsort faldt.

Lodbjerg. S. Ø. 5. Overtr. Sne. 1 Storspove faldt.

Læsø Trindel. S. Ø. 5. Regn og Sne. Enkelte Fugle om Fyret; 1 Lærke faldt.

Møen. S. Ø. Regnbyger. 1 Stær faldt (ikke indsendt).

Numenius arquatus. Lodbjerg 1.
Tringa alpina. Graadyb 1.
Alauda arvensis. Læsø Trindel 1.
Sturnus vulgaris. Graadyb 3, Vyl 5, Horns Rev 5, (Møen 1).
Turdus musicus. Graadyb 1, Horns Rev 2.
Turdus merula. Graadyb 5, Vyl 3, Horns Rev 1.

18de Marts.

Vyl. S. Ø. 4. Skyet. En Irisk faldt.

Lodbjerg. Ø. 5. Overtr. Sne. 1 Solsort og 1 Drossel ved Ruderne efter Midnat; Stære ved Ruderne om Morgenen; 1 Vibe faldt.

Østre Flak. S. Ø. 4. Overtr. Flere Fugle ved Fyret; 1 Stær og 1 Solsort faldt.

Hesselø. S. Ø. 4. 1 Vibe, 1 Skovsneppe, 2 Vindrosler og 1 Stær faldt (intet indsendt).

Sejrø. S. Ø. Diset. Overtr. Endel Stære og andre Smaafugle ved Lanternen; 1 Stær (ikke indsendt) og 1 Vibe faldt.

(1912.)

Stevns. Ø. S. Ø. 4. Overtr. Regnbyger. 1 Skovsneppe faldt.

Sprogø. S. Ø. 3. Diset. 1 Vindrossel faldt (ikke indsendt).

Kjels Nor. S. Ø. 3. Overtr. 1 Lærke, 45 Stære, 7 Sangrosler og 3 Solsorter faldt.

Æbelø. Ø. S. Ø. Diset. Endel Stære og Lærker paa Ruderne; ingen faldt.

Gedser. S. Ø. Overtr. Diset. Mange Stære fløj mod Ruderne, men kun 2 fandtes.

Gedser Rev. S. Ø. 4. Diset. 4 Stære og 2 Snespurve ved Fyret; 1 Stær og 2 Snespurve (1 indsendt) faldt.

Vanellus cristatus. Lodbjerg 1, Sejrø 1.
Scolopax rusticula. Stevns 1.
Alauda arvensis. Kjels Nor 1.
Sturnus vulgaris. Østre Flak 1, (Hesselø 1, Sejrø 1), Kjels Nor 45, Gedser 2, Gedser Rev 1.
Turdus musicus. Kjels Nor 7.
Turdus merula. Østre Flak 1, Kjels Nor 3.
Cannabina linota. Vyl 1.
Emberiza nivalis. Gedser Rev 1 (2 faldt).

19de Marts.

Lodbjerg. Ø. S. Ø. 7. Regn, Sne og Dis. Nogle Stære ved Ruderne efter Midnat; 1 Horsegøg faldt.

Omø. S. Ø. Regndis. 3 Stære og 1 Bogfinke faldt (intet indsendt).

Gallinago scolopacina. Lodbjerg 1.
Sturnus vulgaris. (Omø 3.)

20de Marts.

Lodbjerg. S. S. V. 3. Taage. Nogle Stære ved Ruderne efter Midnat; 1 Præstekrave, 3 Ryler og 1 Stær faldt.

Hanstholm. S. Ø. 2. Taage. Nogle Solsorter og Drosler flagrede om Fyret fra Kl. 11 til Kl. 6 Form.

Læsø Trindel. S. S. V. 3. Skyet. Fugle om Fyret; 1 Lærke og 1 Bogfinke faldt.

Østre Flak. S. Ø. 3. Regn. Flere Fugle ved Fyret; 2 Solsorter faldt.

Hjelm. S. V. 3. Taage. Endel Fugle ved Ruderne; 1 Lærke, 1 Stær, 1 Sangdrossel og 1 Solsort faldt.

(1912.)

Hammeren. S. S. V. 4. Klart. 2 Stære saas paa Ruderne.

Gedser. S. V. Overtr., af og til Regn. 1 Lærke og 1 Vindrossel faldt.

Gedser Rev. S. V. 3. Klart. 1 Sjagger faldt, ellers ingen Fugle ved Fyret.

Ægialitis hiaticula. Lodbjerg 1.
Tringa alpina. Lodbjerg 3.
Alauda arvensis. Læsø Trindel 1, Hjelm 1, Gedser 1.
Sturnus vulgaris. Lodbjerg 1, Hjelm 1.
Turdus iliacus. Gedser 1.
Turdus musicus. Hjelm 1.
Turdus pilaris. Gedser Rev 1.
Turdus merula. Østre Flak 2, Hjelm 1.
Fringilla coelebs. Læsø Trindel 1.

21de Marts.

Vyl. S. V. 3. Regnbyger. Nogle Smaafugle saas af og til; 1 Engpiber faldt.

Lodbjerg. S. V. 3. Overtr., Regn. Dis. Nogle Stære ved Ruderne efter Midnat.

Skagen. S. Ø. 3. Skyet. Endel Lærker og Stære paa Ruderne; 8 Lærker og 1 Solsort faldt.

Læsø Rende. S. V. 3. Skyet. Endel Fugle om Fyret; 2 Lærker og 3 Solsorter faldt.

Østre Flak. S. 2. Regn. Flere Fugle ved Fyret; 1 Stær og 1 Solsort faldt.

Hammeren. V. S. V. 3. Overtr. Omkr. 20 Stære paa Ruderne; 1 faldt (ikke indsendt).

Gedser Rev. S. V. 3. Regn. Omkr. 10 Lærker ved Fyret; 1 faldt.

Alauda arvensis. Skagen 8, Læsø Rende 2, Gedser Rev 1.
Sturnus vulgaris. Østre Flak 1, (Hammeren 1).
Anthus pratensis. Vyl 1.
Turdus merula. Skagen 1, Læsø Rende 3, Østre Flak 1.

22de Marts.

Lodbjerg. S. S. Ø. 3. Regn og Taage. 1 Lærke faldt.

Læsø Trindel. S. 4. Overtr. Fugle ved Fyret; 1 Rødkælk faldt.

Anholt Knob. Ø. S. Ø. 5. Skyet. 6 Stære, 1 Solsort og 1 Bogfinke faldt.

(1912.)

Sejrø. S. S. Ø. Diset og Regn; senere S. Ø. og Regn. Endel Stære, Lærker og Vindrosler om Lanternen; 3 Stære, 3 Vindrosler og 6 Lærker faldt (ikke indsendte).

Æbelø. S. Ø. Regn. Endel Stære, Lærker og Solsorter paa Ruderne; ingen faldt.

Gedser Rev. S. S. Ø. 4. Regn. 3 Stære ved Fyret; 1 Stær (ikke indsendt) og 1 Kernebider faldt.

Alauda arvensis. Lodbjerg 1.
Sturnus vulgaris Anholt Knob 1 (6 faldt), (Sejrø 3).
Turdus merula. Anholt Knob 1.
Erithacus rubecula. Læsø Trindel 1.
Fringilla coelebs. Anholt Knob 1.
Coccothraustes vulgaris. Gedser Rev 1.

23de Marts.

Blaavands Huk. S. V. 4. Graat og diset. 1 And faldt (ikke indsendt).

Lodbjerg. S. S. Ø. 3. Regn og Taage. Flere Stære ved Ruderne hele Natten.

Skagen. S. 4. Overtr. Endel Stære og Solsorter paa Ruderne; 1 Solsort faldt.

Læsø Trindel. V. 4. Overtr. 7 Solsorter faldt.

Østre Flak. S. S. Ø. 3. Overtr. Flere Fugle ved Fyret; 3 Lærker og 1 Solsort faldt.

Sejrø. S. og S. S. V. Overtr. Nogle Lærker ved Lanternen; 5 Lærker og 1 Solsort faldt (ikke indsendte).

Alauda arvensis. Østre Flak 3.
Turdus merula. Skagen 1, Læsø Trindel 7, Østre Flak 1.

24de Marts.

Højen. V. N. V. 3. Overtr. Enkelte Fuglekonger ved Lanternen.

Skagen. V. 3. Skyet. 1 Stær faldt.

Læsø Rende. V. 3. Skyet. 1 Snespurv faldt.

Hammeren. V. S. V. 3. Taage. Omkr. 50 Stære paa Ruderne.

Sturnus vulgaris. Skagen 1.
Emberiza nivalis. Læsø Rende 1.

(1912.)

25de Marts.

Vyl. Ø. 2. Skyet. Flere Smaafugle ved Fyret; 3 Lærker, 1 Stær og 1 Solsort faldt.

Horns Rev. S. S. V. Graat. Omkring 300 forskellige Fugle ved Fyret om Natten; 2 Stære, 1 Vindrossel, 1 Sangdrossel, 5 Solsorter og 3 Skærpibere faldt paa Dækket, medens mange faldt i Vandet, da Vinden bar tværs over Skibet.

Lyngvig. S. 2. Overtr. Mange Lærker og Stære ved Fyret; 1 Lærke og 5 Stære faldt.

Lodbjerg. S. 2. Overtr. Dis. 2 Stære ved Ruderne efter Midnat.

Møen. V. Taage og Regnrusk. 5 Stære faldt (ikke indsendte).

Alauda arvensis. Vyl 3, Lyngvig 1.
Sturnus vulgaris. Vyl 1, Horns Rev 2, Lyngvig 1 (5 faldt). (Møen 5).
Turdus iliacus. Horns Rev 1.
Turdus musicus. Horns Rev 1.
Turdus merula. Vyl 1, Horns Rev 5.
Anthus obscurus. Horns Rev 3.

26de Marts.

Lodbjerg. S. S. V. 3. Overtr. Taage. Mange Stære ved Ruderne efter Midnat.

Skagen. S. V. 3. Taage. Nogle Stære paa Ruderne; 1 faldt.

Læsø Trindel. S. V. 4. Regn. 1 Misteldrossel og 1 Solsort faldt.

Hals Barre. S. V. 4. Skyet. 1 Stær faldt (ikke indsendt).

Anholt Knob. S. 2. Taage. 7 Fugle faldt, deriblandt 1 Lærke, 3 Stære og 1 Solsort.

Schultz's Grund. Taage. 10 Lærker, 1 Stær, 1 Misteldrossel, 2 Solsorter og 1 Rødkælk faldt.

Hov. S. S. V. 2. Tykning. 1 Stær faldt.

Møen. V. Regn, Taage. 3 Stære faldt.

Alauda arvensis. Anholt Knob 1, Schultz's Grund 10.
Sturnus vulgaris. Skagen 1, (Hals Barre 1), Anholt Knob 1 (3 faldt), Schultz's Grund 1, Hov 1, (Møen 3).
Turdus viscivorus. Læsø Trindel 1, Schultz's Grund 1.
Turdus merula. Læsø Trindel 1, Anholt Knob 1, Schultz's Grund 2.
Erithacus rubecula. Schultz's Grund 1.

27de Marts.

Lyngvig. S. V. 5. Overtr. Endel Stære ved Fyret; 1 faldt.

(1912.)

Lodbjerg. S. S. V. 4. Overtr. Dis. Mange Stære ved Ruderne efter Midnat.

Hov. S. S. V. 3. Diset og overtr. 1 Stær faldt.

Gedser Rev. S. V. 3. Klart. 4 Stære, 2 Fuglekonger og nogle enkelte Lærker ved Fyret; 1 Lærke (ikke indsendt) og 1 Stær faldt.

Sturnus vulgaris. Lyngvig 1, Hov 1, Gedser Rev 1.

29de Marts.

Schultz's Grund. Overtr. Regn. 10 Lærker, 1 Stær, 2 Solsorter, 1 Bogfinke og 3 Snespurve faldt.

Alauda arvensis 10.
Sturnus vulgaris 1.
Turdus merula 2.
Fringilla coelebs 1.
Emberiza nivalis 3.

4de April.

Skagen. V. S. V. 4. Overtr. Nogle Stære paa Ruderne.

Læsø Rende. S. V. 3. Regnbyger; 1 Fuglekonge faldt.

Regulus cristatus. Læsø Rende 1.

5te April.

Lodbjerg. V. N. V. 7. Overtr. Dis. 1 Sangdrossel faldt.

Skagen. V. N. V. 6. Regn og Dis. En Brokfugl toges levende paa Ruderne, kun let saaret, hvorfor den sattes i Frihed igen; 1 Vandrikse faldt.

Østre Flak. V. S. V. 3. Regn. Mængder af forskellige Smaafugle vare ved Fyret og paa Skibet, deriblandt 2 Skovduer, da det blev Dag; nogle faldt i Søen; 1 Stær og 1 Solsort faldt paa Dækket.

Sprogø. V. 4. Regn. Dis. 1 Vandrikse faldt.

Gedser Rev. V. 5. Regn. 1 Kramsfugl faldt (ikke indsendt), ellers ingen Fugle ved Fyret.

Rallus aquaticus. Skagen 1, Sprogø 1.
Alauda arvensis. Østre Flak 1.
Turdus musicus. Lodbjerg 1.
Turdus merula. Østre Flak 1.

(1912.)

7de April.

Kjels Nor. V. 6. Overtr. Regn. 1 Vandrikse faldt.

Rallus aquaticus 1.

8de April.

Læsø Rende. S. V. 3. Overtr. 1 Lærke faldt.

Alauda arvensis 1.

10de April.

Læsø Rende. N. Ø. 4. Snebyger. 1 Solsort faldt.

Turdus merula 1.

16de April.

Blaavands Huk. V. N. V. Taage. 1 Lærke og 1 Terne faldt (ikke indsendte).

Østre Flak. S. V. 1. Diset og Taage. 2 Lærker og 1 Kvækerfinke faldt.

Hals Barre. S. V. 2. Taage. En Sneppe og 1 Skovdue faldt (ikke indsendte).

Alauda arvensis. Østre Flak 2.
Fringilla montifringilla. Østre Flak 1.

19de April.

Vyl. S. Ø. 3. Skyet. 2 Rødkælke faldt.

Erithacus rubecula 2.

22de April.

Graadyb. Ø. S. Ø. 1. Skyet. En Bogfinke faldt.

Fringilla coelebs 1.

23de April.

Vyl. N. Ø. 2. Klart. 1 Kvækerfinke faldt.

Fringilla montifringilla 1.

27de April.

Vestborg. N. V. 2. Nogle Smaafugle paa Ruderne; 1 Præstekrave faldt.

Ægialitis hiaticula 1.

3dje Maj.

Skagen. V. S. V. 6. Regn og Dis. Nogle Smaafugle paa Ruderne; 1 Drossel og 1 Fluesnapper faldt (ikke indsendte).

Anholt Knob. S. S. V. 3. Regn. Flere Drosler ved Fyret; 1 Sjagger faldt.

Vestborg. S. V. 3. Taage og Regndis. Mange Smaafugle paa Ruderne; endel faldt; 1 Sangdrossel, 1 Stenpikker og 1 Rødstjert indsendtes.

Turdus musicus. Vestborg 1.
Turdus pilaris. Anholt Knob 1.
Saxicola oenanthe. Vestborg 1.
Ruticilla phoenicura. Vestborg 1.

6te Maj.

Læsø Rende. S. Ø. 3. Regn. 1 Kramsfugl faldt (ikke indsendt).

7de Maj.

Blaavands Huk. Ø. S. Ø. 2. Graat, Smaaregn. 1 Sneppe og mange Smaafugle faldt (intet indsendt).

Lyngvig. Ø. 2. Regn. Endel Smaafugle ved Fyret; 1 Vendehals, 1 Løvsanger, 1 Sangdrossel og 1 Sjagger faldt.

Bovbjerg. Ø. S. Ø. 2. Overtr. Regn. Fra Kl. 12 til 4 Nat vare endel Smaafugle ved Fyret; 1 Vindrossel faldt (ikke indsendt).

Lodbjerg. Ø. 3. Overtr. Regn. Mange Digesmutter, Rødstjerte og Fluesnappere ved Ruderne om Natten; 1 Stenpikker, 1 Rødstjert og 2 Brogede Fluesnappere faldt.

Hanstholm. Ø. 2. Regn. Endel Ringdrosler, Rødkælke og andre Smaafugle om Fyret.

Skagen. S. Ø. 2. Overtr. Regn. Nogle Smaafugle paa Ruderne.

Østre Flak. Ø. S. Ø. 2. Overtr. Regn. Mange Fugle vare ved Fyret; 3 Sjaggere og 2 Rødkælke faldt.

Anholt Knob. S. Ø. 3. Regn. Smaafugle ved Fyret hele Natten.

Iynx torquilla. Lyngvig 1.
Phyllopseustes trochilus. Lyngvig 1.
Turdus musicus. Lyngvig 1.
Turdus pilaris. Lyngvig 1, Østre Flak 3.
Saxicola oenanthe. Lodbjerg 1.

(1912.)

Ruticilla phoenicura. Lodbjerg 1.
Erithacus rubecula. Østre Flak 2.
Muscicapa atricapilla. Lodbjerg 2.

8de Maj.

Lyngvig. S. Ø. 2. Overtr. 1 Sivsanger og 1 Rødstjert faldt.

Hanstholm. Ø. S. Ø. 3. Overtr. En Sjagger og endel forskellige Smaafugle ved Ruderne og om Fyret.

Østre Flak. S. Ø. 2. Overtr. 1 Fuglekonge og 1 Rødkælk faldt.

Anholt Knob. S. Ø. 3. Skyet. 1 Bogfinke faldt.

Acrocephalus phragmitis. Lyngvig 1.
Regulus cristatus. Østre Flak 1.
Ruticilla phoenicura. Lyngvig 1.
Erithacus rubecula. Østre Flak 1.
Fringilla coelebs. Anholt Knob 1.

9de Maj.

Vyl. S. 2. Regn. 2 Bynkefugle faldt.

Fornæs. 1 Vendehals faldt.

Iynx torquilla. Fornæs 1.
Praticola rubetra. Vyl 2.

10de Maj.

Vyl. N. V. 3. Halvklart. 1 Landsvale faldt.

Lappegrunden. N. V. Skyet. 1 Rødstjert faldt.

Hirundo rustica. Vyl 1.
Ruticilla phoenicura. Lappegrunden 1.

12te Maj.

Lappegrunden. S. Overtr. 2 Smaafugle hvilede i Rigningen og fandtes senere døde paa Dækket; 1 Løvsanger og 1 Rødstjert indsendtes.

Phyllopseustes trochilus 1.
Ruticilla phoenicura 1.

15de Maj.

Lodbjerg. V. N. V. 2. Overtr. Dis. Nogle Rødstjerte og Fluesnappere ved Ruderne om Natten.

16de Maj.

Vyl. Ø. S. Ø. 3. Regn. 1 Rødstjert faldt.

(1912.)

Gedser Rev. Ø. S. Ø. 3. Regn. Enkelte Fugle om Fyret; 1 Gøg, 1 Sivsanger, 1 Bynkefugl og 2 Nattergale faldt.

Cuculus canorus. Gedser Rev 1.
Acrocephalus phragmitis. Gedser Rev 1.
Praticola rubetra. Gedser Rev 1.
Ruticilla phoenicura. Vyl 1.
Luscinia philomela. Gedser Rev 2.

17de Maj.

Omø. S. Ø. Regn. 1 Regnspove faldt (ikke indsendt).

18de Maj.

Nakkehoved. Ø. 2. 1 Rødkælk og 1 Broget Fluesnapper faldt.

Erithacus rubecula 1.
Muscicapa atricapilla 1.

19de Maj.

Lyngvig. V. S. V. 3. Overtr. Endel Smaafugle ved Fyret; 1 Pomeransfugl faldt.

Vejrø. N. V. 2. Regndis. Endel Smaafugle om Fyret, ingen faldt.

Eudromias morinellus. Lyngvig 1.

22de Maj.

Skagen. S. Ø. 2. Regntykning. Store Mængder af alle Slags Smaafugle kredsede om Fyret og paa Ruderne.

7de Juni.

Schultz's Grund. Endel Smaafugle sværmede om Fyret om Natten; ingen faldt.

29de Juni.

Læsø Rende. V. 2. Overtr. Mange Fugle, deriblandt Stære ved Fyret; nogle faldt i Vandet.

8de August.

Sletterhage. S. 2. Overtr. Regn. 1 Graaand fløj mod Lanternen og dræbtes (ikke indsendt).

9de August.

Læsø Trindel. V. N. V. 3. Overtr. Enkelte Fugle om Fyret.

Læsø Rende. V. N. V. 4. Skyet. En ubekendt Fugl faldt (ikke indsendt).

(1912.)

10de August.

Skagen. V. 4. Overtr. 1 Mudderklire, 1 Mursejler og 1 Gulbug faldt.

Læsø Rende. V. 3. Skyet. En ubekendt Fugl faldt (ikke indsendt).

Actitis hypoleuca. Skagen 1.
Cypselus apus. Skagen 1.
Hypolais icterina. Skagen 1.

11te August.

Læsø Trindel. V. N. V. 6. Regn. Enkelte Fugle om Fyret.

13de August.

Lodbjerg. V. S. V. 5. Overtr. Regn. Dis. Flere forskellige Fugle kredsede omkring Fyret efter Midnat; 1 Ryle og 1 Broget Fluesnapper faldt.

Skagen. Vind 0. Overtr. Nogle Smaafugle paa Ruderne; 1 faldt (ikke indsendt).

Tringa alpina. Lodbjerg 1.
Muscicapa atricapilla. Lodbjerg 1.

14de August.

Hammeren. V. 4. Diset. Overtr. 1 Kærsanger saas paa Ruderne.

16de August.

Blaavands Huk. S. V. 1. Regn. Mange Fugle ved Fyret; 4 Muddersnepper faldt (ikke indsendte).

Lyngvig. S. Ø. 2. En Islandsk Ryle faldt.

Vestborg. S. V. Overtr. Diset. Nogle Smaafugle paa Ruderne; 1 Sivsanger faldt.

Hammeren. N. V. 3. Overtr. Diset. 2 smaa Fugle paa Ruderne.

Tringa canutus. Lyngvig 1.
Acrocephalus phragmitis. Vestborg 1.

17de August.

Skagen. V. 3. Skyet. Regnspover kredsede om Fyret; endel Smaafugle paa Ruderne; 1 Mudderklire, 1 Tornsanger, 2 Havesangere, 4 Løvsangere og 1 Broget Fluesnapper faldt.

Actitis hypoleuca 1.
Sylvia cinerea 1.

Sylvia hortensis 2.
Phyllopseustes trochilus 4.
Muscicapa atricapilla 1.

18de August.

Lodbjerg. S. S. V. 3. Overtr. Dis. Mange Fluesnappere ved Ruderne efter Midnat; 1 Mudderklire, 1 Havesanger, 1 Høgesanger og 2 Brogede Fluesnappere faldt.

Hanstholm. V. S. V. 3. Graat. Nogle Regnspover, Terner og Smaafugle flagrede om Fyret fra Kl. 12 til Daggry; 1 Mudderklire, 1 Islandsk Ryle, 1 Tornsanger, 3 Løvsangere og 8 Brogede Fluesnappere faldt.

Actitis hypoleuca. Lodbjerg 1, Hanstholm 1.
Tringa canutus. Hanstholm 1.
Sylvia cinerea. Hanstholm 1.
Sylvia hortensis. Lodbjerg 1.
Sylvia nisoria. Lodbjerg 1.
Phyllopseustes trochilus. Hanstholm 3.
Muscicapa atricapilla. Lodbjerg 2, Hanstholm 8.

19de August.

Lyngvig. S. 3. Overtr. Endel Regnspover, Terner og Smaafugle ved Fyret; 1 Mudderklire, 1 Høgesanger og 1 Sivsanger faldt.

Lodbjerg. S. 3. Overtr. Regn. Dis. Nogle Digesmutter og Fluesnappere ved Ruderne om Natten; 1 Rødben og 1 Høgesanger faldt.

Hanstholm. S. 2. Tordenbyger. Nogle Islandske Ryler og Strandskader flagrede om Fyret fra Kl. 12 til 3^{30}; 1 Islandsk Ryle faldt.

Hammeren. S. S. Ø. 3. Regntykning. Omtrent 100 Smaafugle paa Ruderne; 2 Vendehalse, 1 Rørsanger, 1 Sivsanger, 1 Løvsanger og 1 Broget Fluesnapper faldt.

Actitis hypoleuca. Lyngvig 1.
Totanus calidris. Lodbjerg 1.
Tringa canutus. Hanstholm 1.
Iynx torquilla. Hammeren 2.
Sylvia nisoria. Lyngvig 1, Lodbjerg 1.
Acrocephalus arundinaceus. Hammeren 1.
Acrocephalus phragmitis. Lyngvig 1, Hammeren 1.
Phyllopseustes trochilus. Hammeren 1.
Muscicapa atricapilla. Hammeren 1.

(1912)

20de August.

Lyngvig. S. Ø. 2. Overtr. Mange Regnspover, Maager, Terner, Hjejler og Smaafugle ved Fyret; 44 Fugle faldt, deriblandt 1 Storspove, 1 Kobbersneppe, 1 Mudderklire, 1 Hættemaage, 1 Høgesanger, 2 Rødstjerte og 1 Broget Fluesnapper.

Lodbjerg. S. Ø. 3. Overtr. Regn. Dis. Nogle Smaafugle ved Ruderne efter Midnat; 1 Islandsk Ryle, 1 Tornsanger og 1 Sivsanger faldt.

Hanstholm. Ø. N. Ø. 2. Regn. Endel Regnspover, Terner og andre Fugle flagrede om Fyret fra Kl. 12 til 4. En Hjejle faldt (ikke indsendt).

Skagen. S. Ø. 3. Regn. Store Mængder af Smaafugle og endel Terner kredsede om Fyret paa Ruderne og sloge mod Kuplen; 1 Terne toges levende; 1 Hjejle, 2 Islandske Ryler og 1 Vendehals faldt.

Vestborg. S. 2. Regndis. En Mængde Smaafugle flagrede paa Ruderne.

Nordre Rønner. 1 Vendehals faldt.

Schultz's Grund. S. S. V. 2. Overtr. Flere Smaafugle ved Fyret; 1 Strandhjejle og 1 Stenpikker faldt paa Dækket, endel gik overbord.

Nakkehoved. S. Ø. 3. Diset. 1 Vendehals og 1 Havesanger faldt.

Charadrius squatarola. Schults'z Grund 1.
Charadrius pluvialis. Skagen 1.
Numenius arquatus. Lyngvig 1.
Limosa lapponica. Lyngvig 1.
Actitis hypoleuca. Lyngvig 1.
Tringa canutus. Lodbjerg 1, Skagen 2.
Larus ridibundus. Lyngvig 1.
Iynx torquilla. Skagen 1, Nordre Rønner 1, Nakkehoved 1.
Sylvia cinerea. Lodbjerg 1.
Sylvia hortensis. Nakkehoved 1.
Sylvia nisoria. Lyngvig 1.
Acrocephalus phragmitis. Lodbjerg 1.
Saxicola oenanthe. Schultz's Grund 1.
Ruticilla phoenicura. Lyngvig 2.
Muscicapa atricapilla. Lyngvig 1.

(1912.)

21de August.

Skagen. S. V. 2. Regn. 1 Vendehals faldt (ikke indsendt).

22de August.

Hanstholm. V. 3. Overtr. Regnspover, Ryler og endel Smaafugle omkring Fyret fra Kl. 10 til 3^{30}; 3 Havesangere, 12 Løvsangere, 1 Bynkefugl, 1 Rødstjert og 8 Brogede Fluesnappere faldt.

Skagen. V. S. V. 5. Regn. Nogle Smaafugle paa Ruderne; 1 Mudderklire faldt.

Fornæs. V. 4. Skyet. 1 Strandhjejle og 1 Islandsk Ryle faldt.

Charadrius squatarola. Fornæs 1.
Actitis hypoleuca. Skagen 1.
Tringa canutus. Fornæs 1.
Sylvia hortensis. Hanstholm 3.
Phyllopseustes trochilus. Hanstholm 12.
Praticola rubetra. Hanstholm 1.
Ruticilla phoenicura. Hanstholm 1.
Muscicapa atricapilla. Hanstholm 8.

24de August.

Lodbjerg. N. N. V. 4. Overtr. Regn. Dis. Mange Fluesnappere og andre Smaafugle ved Ruderne efter Midnat; 1 Vendehals, 1 Løvsanger og 5 Brogede Fluesnappere faldt.

Iynx torquilla 1.
Phyllopseustes trochilus 1.
Muscicapa atricapilla 5.

25de August.

Skagen. V. S. V. 3. Klart. En Tredækker faldt.

Hals Barre. S. V. 2. Skyet. En Rødkælk faldt (ikke indsendt).

Gallinago major. Skagen 1.

27de August.

Lodbjerg. Ø. N. Ø. 3. Overtr. Regn, Dis. Mange Fluesnappere, Rødstjerte og Digesmutter ved Fyret efter Midnat; 2 Brogede Fluesnappere faldt.

Læsø Trindel. Ø. N. Ø. 4. Regn. 1 Løvsanger, 1 Rødstjert og 2 Brogede Fluesnappere faldt.

Anholt Knob. Ø. 5. Overtr. Regn. Flere Smaafugle paa Ruderne; 1 Mursejler og 1 Rødstjert faldt.

(1912.)

Cypselus apus. Anholt Knob 1.
Phyllopseustes trochilus. Læsø Trindel 1.
Ruticilla phoenicura. Læsø Trindel 1, Anholt Knob 1.
Muscicapa atricapilla. Lodbjerg 2, Læsø Trindel 2.

29de August.

Læsø Trindel. V. 4. Byger. 1 Løvsanger faldt.
Phyllopseustes trochilus 1.

6te September.

Helnæs. V. N. V. 6. Regnbyger. To Graa Fluesnappere sloge mod Ruderne; de fangedes og sattes atter i Frihed om Morgenen; en tredje Fluesnapper fandtes død paa Omgangen ved Fyret (ikke indsendt).

7de September.

Lodbjerg. N. 4. Overtr. Regn. Dis. 2 Rødstjerte ved Ruderne efter Midnat.

Hanstholm. N. N. V. 2. Regnbyger. Endel Smaafugle flagrede om Fyret fra Kl. 11 til 2.

Skagen. N. 2. Skyet. Nogle Havesangere paa Ruderne.

10de September.

Bovbjerg. N. N. V. 2. Regn. Endel Smaafugle ved Fyret.

Hammeren. S. Ø. 2. Regntykning. 4 Rødkælke saas paa Ruderne; flere Smaafugle flagrede omkring Lanternen.

11te September.

Vyl. N. N. V. 4. Regnbyger. En Mængde Smaafugle flagrede omkring Fyret; 1 Tornsanger, 1 Stenpikker og 2 Brogede Fluesnappere faldt.

Lyngvig. N. Ø. 2. Regn. 1 Hjejle, 1 Ryle, 2 Tornsangere, 1 Stenpikker, 2 Rødstjerte og 1 Graa Fluesnapper faldt.

Lodbjerg. N. N. Ø. 4. Overtr. Regn. Dis. Forskellige Smaafugle ved Ruderne om Natten; 1 Havesanger, 1 Ringdrossel og 1 Rødstjert faldt.

Hals Barre. S. S. V. 3. Regn. 1 Sortand faldt.

Vestborg. En Lille Kjove faldt.

(1912.)

Oedemia nigra. Hals Barre 1.
Charadrius pluvialis. Lyngvig 1.
Tringa alpina. Lyngvig 1.
Lestris longicauda. Vestborg 1.
Sylvia cinerea. Vyl 1, Lyngvig 2.
Sylvia hortensis. Lodbjerg 1.
Turdus torquatus. Lodbjerg 1.
Saxicola oenanthe. Vyl 1, Lyngvig 1.
Ruticilla phoenicura. Lyngvig 2, Lodbjerg 1.
Muscicapa grisola. Lyngvig 1.
Muscicapa atricapilla. Vyl 2.

12te September.

Anholt Knob. N. V. 2. Skyet. Rødkælke saas ved Fyret; 1 faldt.
Erithacus rubecula 1.

13de September.

Lyngvig. N. V. 2. Skyet. Endel Drosler ved Fyret; 1 Sangdrossel faldt.

Lodbjerg. V. N. V. 3. Overtr. En Munk faldt efter Midnat.

Skagen. S. V. 2. Overtr. 2 Rødstjerte paa Ruderne; 1 Graa Vipstjert faldt (ikke indsendt).

Læsø Rende. V. 4. Byger. 7 Smaafugle faldt (ikke indsendte).
Sylvia atricapilla. Lodbjerg 1.
Turdus musicus. Lyngvig 1.

14de September.

Lodbjerg. V. N. V. 4. Overtr. Regn. Ingen Fugle iagttaget ved Ruderne; 1 Strandhjejle og 1 Havesanger faldt.

Gedser. V. Diset og overtr. 1 Ryle faldt.
Charadrius squatarola. Lodbjerg 1.
Tringa alpina. Gedser 1.
Sylvia hortensis. Lodbjerg 1.

15de September.

Skagen. N. Ø. 4. Skyet. 1 Krikand faldt.
Anas crecca 1.

16de September.

Hals Barre. V. N. V. 4. Skyet. En Bekkasin faldt (ikke indsendt).

22de September.

Lyngvig. N. V. 2. Overtr. 1 Enkelt Bekkasin faldt.
Limnocryptes gallinula 1.

23de September.

Blaavands Huk. N. V. 1. Graat. 5 Drosler faldt (ikke indsendte).

Vyl. N. N. V. 3. Graat. Flere Smaafugle ved Fyret; 1 Lærke og 1 Sangdrossel faldt.

Hanstholm. N. N. Ø. 2. Graat. 1 Ringdrossel ved Ruderne Kl. 3; enkelte Smaafugle omkring Fyret.

Østre Flak. N. Ø. 2. Overtr. Flere mindre Fugle vare ved Fyret; 2 Lærker, 1 Stenpikker og 2 Rødkælke faldt.

Hals Barre. N. Ø. 3. Skyet. Mange Smaafugle ved Fyret; en Rødkælk faldt.

Anholt Knob. N. Ø. 3. Enkelte Lærker og Stære saas ved Ruderne.

Alauda arvensis. Vyl 1, Østre Flak 2.
Turdus musicus. Vyl 1.
Saxicola oenanthe. Østre Flak 1.
Erithacus rubecula. Østre Flak 2.

26de September.

Vyl. S. Ø. 2. Skyet. Enkelte Smaafugle ved Fyret; 1 Engpiber faldt.

Anthus pratensis 1.

2den Oktober.

Graadyb. N. N. Ø. Regnbyger. Træk af Smaafugle; en Høg ombord om Natten; 1 Engpiber faldt.

Vyl. N. N. Ø. 3. Regn. 1 Engpiber faldt.

Anthus pratensis. Graadyb 1. Vyl 1.

3dje Oktober.

Hirtshals. N. Ø. 4. Byget. En Skovsneppe faldt (ikke indsendt).

4de Oktober.

Graadyb. S. S. V. Byger. Træk af forskellige Smaafugle mod S. 1 Drossel (ikke indsendt) og 2 Engpibere faldt.

Vyl. N. V. 3. Skyet. 1 Gulspurv faldt.

Anthus pratensis. Graadyb 2.
Emberiza citrinella. Vyl 1.

5te Oktober.

Vyl. V. N. V. 3. Skyet. 1 Spurvehøg faldt.

Hammeren. V. S. V. 3. Diset. Overtr. 1 Knortegaas fløj mod Lanterneruderne og faldt.

(1912.)

Anser torquatus. Hammeren 1.
Accipiter nisus. Vyl 1.

6te Oktober.

Graadyb. 1 Vindrossel faldt.

Lodbjerg. V. 4. Overtr. Dis. Ingen Fugle iagttaget ved Ruderne; 1 Blishøne faldt.

Rubjerg Knude. S. S. V. 4. Taage. 1 Krikand og 1 Pibeand fløj mod Lanternen og faldt.

Skagen. V. S. V. 4. Overtr. 1 Vindrossel faldt.

Anas crecca. Rubjerg Knude 1.
Anas penelops. Rubjerg Knude 1.
Fulica atra. Lodbjerg 1.
Turdus iliacus. Graadyb 1, Skagen 1.

7de Oktober.

Lyngvig. S. S. V. 4. Overtr. En Toppet Skallesluger faldt.

Skagen. S. V. 6. Overtr. 1 Sortand og 1 Lærke (ikke indsendt) faldt.

Oedemia nigra. Skagen 1.
Mergus serrator. Lyngvig 1.

8de Oktober.

Vyl. N. N. V. 2. Graat. Flere Smaafugle saas ved Fyret om Morgenen.

Lyngvig. V. N. V. 3. Diset. 20 Vindrosler faldt.

Turdus iliacus. Lyngvig 1 (20 faldt).

9de Oktober.

Lyngvig. Ø. S. Ø. 2. Klart. 1 Lærke faldt.

Alauda arvensis 1.

10de Oktober.

Vyl. S. S. Ø. 2. Klart. Flere Smaafugle vare ved Fyret om Natten; 1 Engpiber faldt.

Gedser Rev. S. Ø. 2. Klart. En Fuglekonge ved Fyret.

Anthus pratensis. Vyl 1.

11te Oktober.

Lyngvig. S. 2. Skyet. 1 Vindrossel faldt.

Turdus iliacus 1.

(1912.)

12te Oktober.

Vyl. V. S. V. 2. Skyet. En Engpiber faldt.

Lyngvig. S. 2. Skyet. 3 Vindrosler faldt.

Lodbjerg. S. 1. Overtr. Dis. Nogle Fuglekonger om Ruderne efter Midnat; 1 Lærke faldt.

Rubjerg Knude. S. 2. Taage. Flere Smaafugle om Fyret; 1 Munk. 1 Vindrossel og 4 Rødkælke faldt.

Læsø Trindel. S. 2. Overtr. Enkelte Smaafugle ved Fyret.

Hals Barre. S. V. 2. Overtr. 4 Vindrosler og 1 Sangdrossel faldt.

Hammeren. N. V. 2. Diset. Stort Træk af Smaafugle; paa Ruderne saas c. 40 Stære og 10 Kongefugle; ingen faldt.

Alauda arvensis. Lodbjerg 1.
Sylvia atricapilla. Rubjerg Knude 1.
Anthus pratensis. Vyl 1.
Turdus iliacus. Lyngvig 1 (3 faldt), Rubjerg Knude 1, Hals Barre 4.
Turdus musicus. Hals Barre 1.
Erithacus rubecula. Rubjerg Knude 4.

13de Oktober.

Graadyb. S. S. V. Taage og Skyet. Træk af Smaafugle; 1 Engpiber, 1 Skærpiber, 1 Sangdrossel og 1 Rødkælk faldt.

Blaavands Huk. V. S. V. 1. Graat. Diset. Mange Fugle ved Fyret; 16 Drosler faldt (ikke indsendte).

Vyl. S. V. 2. Graat. Endel Smaafugle ved Fyret om Natten.

Horns Rev. Ø. N. Ø. Overtr. Nogle Fugle om Fyret; 1 Engpiber, 2 Vindrosler, 1 Sangdrossel og 1 Rødkælk faldt.

Lyngvig. Ø. S. Ø. 2. Taage. Mange Drosler ved Fyret; 1 Ryle og 20 Vindrosler faldt.

Bovbjerg. S. Ø. 2. Dis og Regn. Endel Rødkælke, Kongefugle og Drosler ved Fyret hele Natten.

Lodbjerg. S. V. 1. Overtr. Dis. 1 Drossel og nogle Rødkælke ved Ruderne før Midnat; 1 Lærke faldt.

Skagen. V. S. V. 3. Overtr. Endel Lærker, Vindrosler, Sjaggere, Kvækere, Rødbryst, Rødstjerte, Kongefugle m. fl. paa Ruderne; 9 Lærker, 1 Stær, 1 And og 2 Vindrosler faldt (intet indsendt).

(1912.)

Læsø Trindel. S. 2. Overtr. Enkelte Fugle om Fyret; 2 Fuglekonger og 1 Kvækerfinke faldt.

Læsø Rende. S. S. V. 2. Overtr. Endel Fugle ved Fyret; enkelte faldt i Vandet; 1 Horsegøg, 1 Gransanger, 1 Fuglekonge, 1 Sangdrossel og 1 Rødkælk faldt paa Dækket.

Østre Flak. S. 1. Overtr. Flere mindre Fugle vare ved Fyret; 1 Munk faldt.

Hals Barre. S. S. Ø. 3. Diset. Utallige Fugle ved Fyret.

Kjels Nor. Vind 0. Overtr. Diset. 1 Vagtel, 1 Enkelt Bekkasin, 1 Vindrossel og 3 Rødkælke faldt.

Coturnix communis. Kjels Nor 1.
Tringa alpina. Lyngvig 1.
Gallinago scolopacina. Læsø Rende 1.
Limnocryptes gallinula. Kjels Nor 1.
Alauda arvensis. Lodbjerg 1.
Sturnus vulgaris. (Skagen 1.)
Sylvia atricapilla. Østre Flak 1.
Phyllopseustes rufus. Læsø Rende 1.
Regulus cristatus. Læsø Trindel 2, Læsø Rende 1.
Anthus pratensis. Graadyb 1, Horns Rev 1.
Anthus obscurus. Graadyb 1.
Turdus iliacus. Horns Rev 2, Lyngvig 1 (20 faldt), Kjels Nor 1.
Turdus musicus. Graadyb 1, Horns Rev 1, Læsø Rende 1.
Erithacus rubecula. Graadyb 1, Horns Rev 1, Læsø Rende 1, Kjels Nor 3.
Fringilla montifringilla. Læsø Trindel 1.

14de Oktober.

Skagen. S. 3. Overtr. Regn. Lærker, Vindrosler og Kongefugle paa Ruderne; 1 Lærke, 1 Bogfinke og 6 Vindrosler faldt (ikke indsendte).

Læsø Rende. S. 3. Overtr. Endel Fugle ved Fyret; 5 Lærker, 2 Vindrosler, 2 Sangdrosler og 2 Rødkælke faldt.

Østre Flak. S. 3. Overtr. Flere mindre Fugle og en stor Ugle vare ved Fyret; 5 Lærker faldt.

Hals Barre. S. S. Ø. 3. Diset. 1 Vandrikse, 6 Lærker, 1 Fuglekonge, 2 Vindrosler og 1 Sangdrossel faldt.

Anholt Knob. S. 3. Enkelte Fugle ved Fyret; 1 Vindrossel faldt.

(1912.)

Anholt. S. V. 4. Regn. 13 Drosler, 19 Lærker, nogle Rødkælke og Gærdesmutter faldt (intet indsendt).

Hammeren. V. S. V. 5. Taage og Regnbyger. Endel Smaafugle svævede om Lanternen; 10 Stære saas paa Ruderne.

Gedser Rev. S. Ø. 2. Skyet. 1 Gærdesmutte ved Fyret.

Rallus aquaticus. Hals Barre 1.
Alauda arvensis. Læsø Rende 3 (5 faldt), Østre Flak 5, Hals Barre 6.
Regulus cristatus. Hals Barre 1.
Turdus iliacus. Læsø Rende 2, Anholt Knob 1, Hals Barre 2.
Turdus musicus. Læsø Rende 2, Hals Barre 1.
Erithacus rubecula. Læsø Rende 2.

15de Oktober.

Lodbjerg. N. V. 10. Overtr. Regn. Dis. Ingen Fugle iagttaget ved Ruderne; 1 Vibe faldt.

Skagen. V. 9. Klart. En And faldt (ikke indsendt).

Læsø Trindel. V. 4. Skyet. Enkelte Fugle ved Fyret; 1 Sangdrossel faldt.

Læsø Rende. V. 3. Skyet. Endel Smaafugle ved Fyret; 1 Fuglekonge, 2 Rødkælke og 1 Rørspurv faldt.

Anholt Knob. V. N. V. 2. Enkelte Fugle ved Fyret; 1 Rødkælk faldt.

Sejrø. N. V. og V. Skyet. Nogle Lærker ved Lanternen; 1 faldt (ikke indsendt).

Gedser Rev. S. 3. Taage. 2 Stære ved Fyret; 1 faldt. Regnspover hørtes.

Vanellus cristatus. Lodbjerg 1.
Sturnus vulgaris. Gedser Rev 1.
Regulus cristatus. Læsø Rende 1.
Turdus musicus. Læsø Trindel 1.
Erithacus rubecula. Læsø Rende 2, Anholt Knob 1.
Emberiza schoeniclus. Læsø Rende 1.

16de Oktober.

Blaavands Huk. Omløbende Vind. Regn og Dis. En Mængde Fugle ved Fyret; 67 Drosler og 1 Muddersneppe faldt (intet indsendt).

Vyl. V. S. V. 2. Regnbyger. Endel Smaafugle ved Fyret, deriblandt Stær og Drossel samt smaa Sangfugle.

(1912.)

Horns Rev. V. S. V. Regnbyger. Endel Smaafugle ved Fyret; 1 Vindrossel faldt paa Dækket.

Lyngvig. V. 2. Regn. 1 Horsegøg, 105 Vindrosler og 2 Kvækerfinker faldt.

Lodbjerg. V. 3. Overtr. Dis. 2 Drosler ved Fyret før Midnat; flere Drosler, 1 Stær, 1 Fuglekonge og 1 Rødkælk ved Ruderne efter Midnat; 1 Gransanger, 1 Vindrossel og 1 Sangdrossel faldt.

Hanstholm. V. S. V. 2. Graat. Endel Ringdrosler og Vindrosler samt Smaafugle omkring Fyret.

Læsø Rende. S. S. V. 4. Skyet. 1 Vandrikse faldt.

Østre Flak. V. 3. Skyet. Enkelte Fugle ved Fyret; 1 Vindrossel faldt.

Hals Barre. V. 3. Diset. Utallige Fugle ved Fyret; mange faldt i Vandet; 1 Gærdesmutte, 2 Fuglekonger, 3 Lærker og 1 Kvækerfinke faldt paa Dækket.

Anholt Knob. N. V. 3. Skyet. Enkelte Fugle ved Fyret; 1 Lærke faldt.

Sejrø. S. Diset. Endel Stære, Lærker og Vindrosler ved Lanternen; 3 Lærker og 2 Vindrosler faldt (ikke indsendte).

Vestborg. V. S. V. Diset. En Mængde Smaafugle paa Ruderne; efter Slaget at dømme maa nogle være faldne, men ingen blev fundet.

Hammeren. S. S. V. 2. Diset. Omtr. 20 Stære, 12 Kongefugle og 1 Høg paa Ruderne hele Natten.

Gedser Rev. V. N. V. 3. Meget mørkt; 2 Stære ved Fyret; 1 Sangdrossel faldt.

Rallus aquaticus. Læsø Rende 1.
Gallinago scolopacina. Lyngvig 1.
Alauda arvensis. Hals Barre 3, Anholt Knob 1.
Troglodytes parvulus. Hals Barre 1.
Phyllopseustes rufus. Lodbjerg 1.
Regulus cristatus. Hals Barre 2.
Turdus iliacus. Horns Rev 1, Lyngvig 1 (105 faldt), Lodbjerg 1, Østre Flak 1.
Turdus musicus. Lodbjerg 1, Gedser Rev 1.
Fringilla montifringilla. Lyngvig 2, Hals Barre 1.

(1912.)

17de Oktober.

Lodbjerg. S. 4. Overtr. Regn. Dis. 2 Drosler og 1 Stær ved Ruderne efter Midnat.

Anholt Knob. N. V. 3. Overtr. Enkelte Fugle ved Fyret: 1 Rødkælk faldt.

Gedser Rev. S. 2. Skyet. Nogle enkelte Kramsfugle ved Fyret; 1 Vindrossel faldt.

Turdus iliacus. Gedser Rev 1.
Erithacus rubecula. Anholt Knob 1.

18de Oktober.

Læsø Trindel. V. S. V. 3. Overtr. Enkelte Regnbyger. Fugle om Fyret; endel faldt i Vandet; 3 Fuglekonger, 2 Vindrosler, 1 Solsort og 1 Rødkælk faldt paa Dækket.

Anholt Knob. N. N. Ø. 2. Skyet. Enkelte Fugle saas ved Ruderne.

Anholt. S. V. 4. Overtr. 2 Vindrosler og 4 Lærker faldt (ikke indsendte).

Hammeren. V. N. V. 5. Regntykning. 10 Stære og 2 Rødkælke paa Ruderne.

Regulus cristatus. Læsø Trindel 3.
Turdus iliacus. Læsø Trindel 2.
Turdus merula. Læsø Trindel 1.
Erithacus rubecula. Læsø Trindel 1.

19de Oktober.

Vyl. V. S. V. 2. Regn. Endel Lærker og Stære ved Fyret; 3 Lærker og 1 Stær faldt.

Lyngvig. S. 3. Regn. Mange Stære ved Fyret; 4 faldt.

Lodbjerg. S. S. Ø. 4. Overtr. Regn og Dis. Endel Stære ved Ruderne efter Midnat.

Hanstholm. S. S. V. 2. Graat. Nogle Ringdrosler, Vindrosler og Sjaggere omkring Fyret ved Midnat.

Skagen. S. V. 3. Overtr. En Mængde Stære, nogle Drosler, Rødbryste, Rødstjerte, Kongefugle o. a. paa Ruderne; 1 Thorshane, 1 Stær og 1 Fuglekonge faldt.

Læsø Rende. V. S. V. 3. Overtr. Flere Fugle ved Fyret; 1 Enkelt

Bekkasin, 1 Lærke, 1 Fuglekonge, 2 Vindrosler, 1 Sangdrossel, 1 Solsort og 3 Rødkælke faldt.

Østre Flak. S. S. V. 2. Overtr. Flere Fugle saas ved Fyret; 1 Lærke, 2 Vindrosler, 1 Sangdrossel, 1 Solsort og 1 Rødkælk faldt.

Anholt Knob. S. Ø. 2. Overtr. Enkelte Fugle saas ved Ruderne.

Anholt. S. V. 4. Overtr. 1 Bekkasin, 1 Vandhøne, 10 Vindrosler og 5 Lærker faldt (ikke indsendte).

Nakkehoved. Vind 0. Diset, enkelte Regnbyger. En Mængde Fugle om Fyret hele Natten; 1 Fuglekonge, og 8 Rødkælke faldt.

Hammeren. N. N. Ø. 3. Overtr. Diset. 20 Stære og 40 Kongefugle saas paa Ruderne; 1 Drossel og 1 Lærke faldt (ikke indsendte).

Gedser Rev. V. N. V. 3. Regnbyger. 3 Rødkælke ved Fyret; 1 faldt.

Limnocryptes gallinula. Læsø Rende 1.
Phalaropus fulicarius. Skagen 1.
Alauda arvensis. Vyl 3, Læsø Rende 1, Østre Flak 1.
Sturnus vulgaris. Vyl 1, Lyngvig 1 (4 faldt), Skagen 1.
Regulus cristatus. Skagen 1, Læsø Rende 1, Nakkehoved 1.
Turdus iliacus. Læsø Rende 2, Østre Flak 2.
Turdus musicus. Læsø Rende 1, Østre Flak 1.
Turdus merula. Læsø Rende 1, Østre Flak 1.
Erithacus rubecula. Læsø Rende 3, Østre Flak 1, Nakkehoved 8, Gedser Rev 1.

20de Oktober.

Graadyb. S. S. V. 4. Skyet. 1 Stær faldt.

Rubjerg Knude. S. S. Ø. 4. Flere Smaafugle om Fyret; 1 Lærke, 1 Stær, 2 Vindrosler og 1 Rødkælk faldt.

Hals Barre. S. S. V. 2. Overtr. 2 Lærker, 1 Vindrossel og 2 Rødkælke faldt.

Anholt Knob. V. 3. Skyet. Enkelte Fugle saas ved Ruderne.

Alauda arvensis. Rubjerg Knude 1, Hals Barre 2.
Sturnus vulgaris. Graadyb 1, Rubjerg Knude 1.
Turdus iliacus. Rubjerg Knude 2, Hals Barre 1.
Erithacus rubecula. Rubjerg Knude 1, Hals Barre 2.

21de Oktober.

Graadyb. S. Ø. 5. Skyet. 1 Lærke, 1 Stær, 2 Vindrosler og 3 Sangdrosler faldt.

(1912.)

Blaavands Huk. S. 4. Regnbyger. Mange Stære ved Fyret; 10 Stære og 3 Drosler faldt (ikke indsendte).

Vyl. S. 4. Regn. Enkelte Stære om Fyret; 1 faldt.

Lyngvig. S. S. Ø. 5. Overtr. Endel Drosler og Stære ved Fyret; 4 Drosler (ikke indsendte) og 2 Stære faldt.

Lodbjerg. S. S. Ø. 5. Overtr. Regn. Dis. Mange Stære og 2 Drosler ved Ruderne efter Midnat; 1 Stær faldt.

Hanstholm. S. Ø. 4. Graat. Endel Vindrosler og Solsorter omkring Fyret fra Kl. 12 til Daggry.

Sejrø. S. S. Ø. Regndis. Mange Lærker omkring Lanternen; 20 Lærker, 1 Stær og 1 Rødkælk faldt.

Sprogø. S. 3. Taaget. 1 Stær (ikke indsendt), 9 Lærker, 11 Vindrosler og 4 Sangdrosler faldt.

Hov. S. Tiltagende stiv Kuling, Regn og diset Luft. 1 Vindrossel faldt.

Kjels Nor. S. Ø. 4. Overtr. Regn. 1 Lærke, 2 Stære, 30 Vindrosler og 11 Sangdrosler faldt.

Æbelø. S. Diset. Stære, Lærker og Sangdrosler paa Ruderne; 6 Lærker og 2 Sangdrosler faldt (intet indsendt).

Gedser Rev. S. 2. Skyet. Omkring 30 Fugle ved Fyret; 2 Lærker, 3 Fuglekonger, 2 Rødkælke og 1 Svenske faldt.

Alauda arvensis. Graadyb 1, Sprogø 9, Kjels Nor 1, Gedser Rev 2.
Sturnus vulgaris. Graadyb 1, (Blaavands Huk 10), Vyl 1, Lyngvig 1 (2 faldt), Lodbjerg 1, (Sejrø 1, Sprogø 1), Kjels Nor 2.
Regulus cristatus. Gedser Rev 3.
Turdus iliacus. Graadyb 2, Sprogø 11, Hov 1, Kjels Nor 30.
Turdus musicus. Graadyb 3, Sprogø 4, Kjels Nor 11.
Erithacus rubecula. Gedser Rev 2.
Ligurinus chloris. Gedser Rev 1.

22de Oktober.

Blaavands Huk. Ø. S. Ø. 4. Regn. Mange Stære ved Fyret; 35 Drosler og 10 Stære faldt (ikke indsendte).

Vyl. Ø. S. Ø. 4. Regn. Mange Fugle ved Fyret; endel faldt i Vandet; 30 Lærker, 12 Stære og 40 Drosler faldt paa Dækket.

Horns Rev. S. Ø. Regn og Byger. Omkr. 400 Smaafugle ved Fyret; 55 faldt paa Dækket (ikke indsendte).

Lyngvig. Ø. S. Ø. 4. Overtr. 1 Pibeand, 23 Lærker og 58 Vindrosler faldt.

Lodbjerg. Ø. S. Ø. 6. Overtr. Mange Stære og Drosler ved Ruderne efter Midnat; 1 Horsegøg, 2 Vindrosler og 1 Sangdrossel faldt.

Hanstholm. Ø. S. Ø. 5. Graat. Endel Vindrosler omkring Fyret fra Kl. 1 til Daggry.

Omø. S. Ø. Diset. 2 Stære og 1 Sangdrossel faldt (intet indsendt).

Anas penelops. Lyngvig 1.
Gallinago scolopacina. Lodbjerg 1.
Alauda arvensis. Vyl 5, Lyngvig 1 (23 faldt).
Sturnus vulgaris. (Blaavands Huk 10), Vyl 2 (12 faldt), (Omø 2).
Turdus iliacus. Vyl 1, Lyngvig 1 (58 faldt), Lodbjerg 2.
Turdus musicus. Vyl 4, Lodbjerg 1.

23de Oktober.

Blaavands Huk. Ø. 5. Graat. 25 Drosler og 8 Stære faldt (intet indsendt).

Vyl. Ø. 4. Graat. Enkelte Fugle om Fyret; 2 Stære faldt.

Omø. S. Ø. Storm og Regn. 3 Stære og 2 Lærker faldt (intet indsendt).

Nakkehoved. S. Ø. 9. Diset. 2 Fuglekonger faldt.

Sturnus vulgaris. (Blaavands Huk 8), Vyl 2.
Regulus cristatus. Nakkehoved 1.

24de Oktober.

Vyl. Ø. S. Ø. 4. Skyet. Enkelte Fugle om Fyret; 1 Lærke og 1 Stær faldt.

Lodbjerg. Ø. S. Ø. 7. Overtr. Regn. Dis. 2 Stære ved Ruderne om Morgenen.

Gedser Rev. Ø. S. Ø. 4. Regn. Omkr. 50 Kramsfugle og enkelte Lærker, Fuglekonger og Regnspover ved Fyret; 15 Kramsfugle faldt; 1 Vindrossel og 1 Sangdrossel indsendtes.

Alauda arvensis. Vyl 1.
Sturnus vulgaris. Vyl 1.
Turdus iliacus. Gedser Rev 1.
Turdus musicus. Gedser Rev 1.

(1912.)

25de Oktober.

Vyl. Ø. S. Ø. 4. Skyet. Enkelte Fugle om Fyret; 2 Stære faldt.
Sturnus vulgaris 2.

26de Oktober.

Sprogø. S. Ø. 3. Overtr. 1 Stær faldt (ikke indsendt).
(*Sturnus vulgaris* 1.)

27de Oktober.

Gedser Rev. S. S. Ø. 4. Overtr. Omkr. 10 Fuglekonger ved Fyret.

28de Oktober.

Hesselø. S. V. 3. Regndis. 2 Stære og nogle Lærker faldne (intet indsendt).
(*Sturnus vulgaris* 2.)

29de Oktober.

Blaavands Huk. S. V. 4. Regntykning. 1 Vindrossel og 1 Sangdrossel faldt.

Vyl. S. S. V. 4. Regn. 1 Kvækerfinke faldt.

Lodbjerg. S. 2. Overtr. Taage. 1 Vindrossel og 1 Stær ved Ruderne om Morgenen.

Turdus iliacus Blaavands Huk 1.
Turdus musicus. Blaavands Huk 1.
Fringilla montifringilla. Vyl 1.

30te Oktober.

Blaavands Huk. V. S. V. Graat. Diset. 6 Vindrosler og 1 Sangdrossel faldt.

Turdus iliacus 6.
Turdus musicus 1.

31te Oktober.

Blaavands Huk. V. S. V. 4. Regn. 1 Stær og 1 Vindrossel faldt.

Lyngvig. S. V. 4. Regn. En Horsegøg faldt.

Lodbjerg. S. S. Ø. 3. Overtr. Regn. Dis. 2 Stære ved Ruderne før Midnat.

Østre Flak. N. 4. Regnbyger. 1 Vindrossel og 2 Sjaggere faldt.

Anholt. V. 4. Regn og Dis. 8 Drosler faldt (ikke indsendte).

Gallinago scolopacina. Lyngvig 1.
Sturnus vulgaris. Blaavands Huk 1.
Turdus iliacus. Blaavands Huk 1, Østre Flak 1.
Turdus pilaris. Østre Flak 2.

1ste November.

Hals Barre. N. V. Regnbyger. 2 Sjaggere faldt.

Anholt Knob. N. 8. Skyet. 1 Sjagger faldt.

Sprogø. N. N. V. 9. Sigtbart. 1 Stær faldt (ikke indsendt).

Gedser Rev. S. V. 3. Regn. Enkelte Lærker og Fuglekonger ved Fyret.

Sturnus vulgaris. (Sprogø 1.)
Turdus pilaris. Hals Barre 2, Anholt Knob 1.

2den November.

Østre Flak. N. V. 4. Overtr. 1 Kvækerfinke faldt.

Sprogø. Mange Fuglekonger paa Lanterneruderne.

Fringilla montifringilla. Østre Flak 1.

4de November.

Blaavands Huk. N. N. V. 5. Regnbyger. 1 Lærke og 1 Vindrossel faldt.

Horns Rev. 5 Lærker, 5 Stære, 1 Vindrossel og 4 Sangdrosler faldt.

Alauda arvensis. Blaavands Huk 1, Horns Rev 5.
Sturnus vulgaris. Horns Rev 5.
Turdus iliacus. Blaavands Huk 1, Horns Rev 1.
Turdus musicus. Horns Rev 4.

5te November.

Blaavands Huk. Ø. 2. Regntykning. 1 Sortand, 6 Vindrosler og 2 Sangdrosler faldt.

Vyl. S. Ø. 2. Regn. Endel Drosler ved Fyret om Natten; 1 Sjagger faldt.

Lyngvig. S. Ø. 2. Regn. Enkelte Drosler og Solsorter ved Fyret; 3 Sjaggere faldt.

Bovbjerg. S. Ø. 2. Regntykning. 1 Solsort faldt.

Hanstholm. V. N. V. 2. Overtr. Enkelte Sjaggere og Solsorter ved Ruderne fra Kl. 11 til 12.

Gedser Rev. V. 6. Skyet. Enkelte Smaafugle ved Fyret.

(1912.)

Oedemia nigra. Blaavands Huk 1.
Turdus iliacus. Blaavands Huk 6.
Turdus musicus. Blaavands Huk 2.
Turdus pilaris. Vyl 1, Lyngvig 1 (3 faldt).
Turdus merula. Bovbjerg 1.

7de November.

Omø. S. V. 3. Sigtbart. 1 Knortegaas faldt (ikke indsendt).

8de November.

Blaavands Huk. S. V. 4. Regn og Taage. 1 Vandrikse, 1 Ryle, 1 Lærke og 2 Stære faldt.

Skagens Rev. V. S. V. 2. Overtr. Regn. 1 Solsort faldt.

Rallus aquaticus. Blaavands Huk 1.
Tringa alpina. Blaavands Huk 1.
Alauda arvensis. Blaavands Huk 1.
Sturnus vulgaris. Blaavands Huk 2.
Turdus merula. Skagens Rev 1.

9de November.

Læsø Trindel. N. 2. Overtr. Endel Fugle om Fyret hele Natten; 1 Bogfinke faldt (ikke indsendt).

Læsø Rende. N. 2. Overtr. 1 Sortand og 2 Snespurve faldt.

Østre Flak. N. 1. Overtr. 1 Lærke, 2 Sjaggere og 6 Snespurve faldt; flere Fugle vare ved Skibet, da det blev Dag.

Oedemia nigra. Læsø Rende 1.
Alauda arvensis. Østre Flak 1.
Turdus pilaris. Østre Flak 2.
Emberiza nivalis. Læsø Rende 2, Østre Flak 6.

10de November.

Vyl. S. V. 3. Regn. Endel Drosler saas ved Fyret om Natten; 1 Stær faldt.

Lodbjerg. S. 4. Overtr. Regn. Dis. 1 Drossel og 2 Stære ved Ruderne før Midnat.

Skagens Rev. V. S. V. 2. Overtr. 1 Topskarv faldt.

Gedser Rev. S. 3. Regnbyger. Enkelte Lærker og Rødkælke ved Fyret.

Phalacrocorax graculus. Skagens Rev 1.
Sturnus vulgaris. Vyl 1.

(1912.)

12te November.

Østre Flak. S. S. V. 3. Skyet. 1 Sjagger faldt.

Anholt. N. Ø. 4. Regn. 7 Drosler faldt (intet indsendt).

Turdus pilaris. Østre Flak 1.

14de November.

Blaavands Huk. N. Ø. 2. Regn. 2 Lærker faldt.

Vyl. N. Ø. 3. Regn. Enkelte Smaafugle ved Fyret om Natten; 1 Lærke faldt.

Bovbjerg. N. Ø. 2. Regndis. 1 Vindrossel ved Fyret.

Sejrø. N. Ø. Regn. 2 Sjaggere faldt.

Alauda arvensis. Blaavands Huk 2, Vyl 1.
Turdus pilaris. Sejrø 2.

15de November.

Lyngvig. Vind 0. Overtr. 2 Vindrosler faldt.

Lodbjerg. S. S. V. 2. Overtr. En Fuglekonge ved Ruderne om Morgenen.

Turdus iliacus. Lyngvig 1 (2 faldt).

17de November.

Blaavands Huk. S. Ø. 2. Dis. 1 Lærke faldt.

Vyl. Ø. S. Ø. 2. Graat. Endel Fugle om Fyret hendad Morgenstunden; 2 Solsorter faldt.

Lyngvig. S. S. Ø. 2. Overtr. Endel Smaafugle ved Fyret; 1 Enkelt Bekkasin og 1 Solsort faldt.

Omø. Vind 0. Taage. 1 Krikand faldt (ikke indsendt).

Limnocryptes gallinula. Lyngvig 1.
Alauda arvensis. Blaavands Huk 1.
Turdus merula. Vyl 2, Lyngvig 1.

18de November.

Blaavands Huk. S. V. 2. Regn. Dis. 1 Sjagger faldt.

Lyngvig. S. V. 2. Overtr. 1 Solsort faldt.

Sprogø. S. 4. Taage. 1 Vindrossel faldt (ikke indsendt).

Kjels Nor. S. 3. Overtr. Dis. 1 Grønbenet Rørhøne faldt.

Gallinula chloropus. Kjels Nor 1.
Turdus pilaris. Blaavands Huk 1.
Turdus merula. Lyngvig 1.

(1912.)

19de November.

Sprogø. N. 4. Taage. Smaafugle paa Lanterneruderne; 1 Sjagger faldt (ikke indsendt).

Kjels Nor. N. V. 2. Regntykning. 1 Stokand faldt.

Gedser Rev. S. 2. Taage. Endel Smaafugle ved Fyret.

Anas boscas. Kjels Nor 1.

21de November.

Sprogø. N. 4. Overtr. 1 Rødkælk faldt (ikke indsendt).

27de November.

Kjels Nor. S.—S.V. 2. Overtr. Diset. 1 Ringdue faldt.

Columba palumbus 1.

4de December.

Graadyb. N. V. 4. Skyet. Byger. 1 Taarnfalk faldt.

Falco tinnunculus 1.

5te December.

Skagen. V. S. V. 6. Taage. 1 Sortand faldt.

Oedemia nigra 1.

7de December.

Lodbjerg. S. 3. Regn. Taage. 1 Snespurv ved Ruderne om Morgenen.

9de December.

Omø. V. S. V. 2. Taage. Mellem 7 og 8 Aften kredsede en stor Flok Ederfugle omkring Taarn og Bolig; i Løbet af et Kvarter faldt 12 Stkr. (7 Hanner og 5 Hunner; ingen indsendtes).

Kjels Nor. S. S. V. 2. Regndis. 1 Ringdue faldt.

Columba palumbus. Kjels Nor 1.

11te December.

Sejrø. S. V. Regntaage. 1 Enkelt Bekkasin faldt.

Limnocryptes gallinula 1.

12te December.

Lodbjerg. S. 5. Overtr. Regn, Taage. 1 Stær ved Ruderne før Midnat.

13de December.

Omø. V. S. V. Klart. Diset. 2 Graaænder faldt (ikke indsendte).

15de December.

Nordre Rønner. V. N. V. 9. 1 Strandryle faldt (ikke indsendt).

27de December.

Lyngvig. N. 2. Taage. 1 Ryle faldt.
Tringa alpina 1.

Forskellige Iagttagelser fra Fyrene.

Graadyb Fyrskib. Februar: *17de* S. V. 1. Taage. Træk af Lærker, Stære og Smaafugle ved Skibet. — Marts: *4de* S. S. Ø. 1. Graavejr. Træk af Smaafugle og Viber mod N. *8de* S. S. V. 2. Diset. Træk af Smaafugle og Viber mod N. *12te* S. V. 1. Klart. Træk af større, ubekendte Fugle mod N. — April: *5te* V. 5. Diset. Træk af Ænder mod N. *10de* S. 1. Klart. Træk af Ænder mod N. — J. S. Ibsen. — Juni: *7de* S. Ø. 2. Skyet. Træk af Ænder mod S. — August: *13de* V. S. V. 2. Regnbyger. Træk af Regnspover og Strandskader mod S. *19de* S. V. Regnbyger. Ænder trak mod S. Ø. *21de* V. S. V. Regnbyger. Ænder trak mod S. *27de* S. V. Regnbyger. Ænder og Smaafugle trak mod S. — December: *3dje* mange Maager om Skibet. — R. M. Nielsen.

Vyl Fyrskib. Januar: *25de* Vind 0. Taage. Enkelte Lærker saas. — Februar: *23de* flere Krager hvilede i Morges i Riggen og fløj derpaa mod Ø. Store Flokke af Ænder ere i den senere Tid sete fra Skibet. *26de* S. V. 2. Graat. Et Par Krager sad i Rigningen. — Marts: *9de* S. S. V. 3. Skyet. 10 Raager kom flyvende fra Ø. mod V. *10de* S. Ø. 2. Skyet. En Flok Viber kom flyvende fra V. mod Ø. *13de* S. 2. Graat. Flere Krager og en Ringdue hvilede sig en Tid paa Skibet. *17de* S. Ø. 4. Graat. Mange forskellige Fugle saas i Morges ved Skibet. *18de* S. Ø. 4. Skyet. Sortkrager, Stære, Bogfinker og Vipstjerte opholdt sig paa Skibet. *24de* en Blodstjert opholdt sig paa Dækket idag. — April: *11te* S. V. 3. Snebyger. En Snespurv hvilede sig paa Dækket. *22de* N. Ø. 2. Klart. Et Par Sangdrosler opholdt sig paa Skibet i For-

(1912.)
middags; en lille Fugl opholdt sig i Eftermiddag paa Skibet. *23de* samme lille Fugl, som opholdt sig paa Dækket igaar Eftermiddag, fandtes imorges død (en Kvæker indsendt). — Maj: *9de* S. 2. Regn. Enkelte Smaafugle sete ved Skibet. *16de* Ø. S. Ø. 3. Regn. Svaler og enkelte Sangfugle saas; en Skovdue saas flyve et Par Gange om Skibet, derpaa fløj den mod Ø. *29de* N. V. 4. Graat. Flere Smaafugle saas; en Svale hvilede en Tid paa Dækket; en Ryle saas flyve omkring; flere Terner samt endel Suler saas. — Juni: *6te* S. 3. Skyet. En Ugle opholdt sig i Rigningen. *8de* S. V. 2. Skyet. En Skovdue opholdt sig en Tid paa Skibet. *17de* en Svale [Hirundo rustica] fandtes død nede paa en Hylde i et Rum om Læ. — September: *24de* Ø. N. Ø. 2. Skyet. En Fuglekonge og nogle Lærker opholdt sig en Tid paa Dækket. *29de* Ø. S. Ø. 5. Skyet. En stor Flok Lærker fløj i Eftermiddag mod S.; endel Smaafugle opholdt sig paa Dækket; en Høg har hele Natten været ved Skibet. — Oktober: *3dje* N. Ø. 3. Skyet. En Gærdesmutte, nogle Bogfinker og Gulspurve opholdt sig paa Skibet. *4de* en Høg opholdt sig hele Dagen omkring Skibet. *5te* en Høg [Accipiter nisus], vistnok den samme som saas igaar, fandtes indeklemt mellem nogle Tønder i Lanternehuset og var død. *12te* V. S. V. 2. Skyet. En Høg kredsede i længere Tid om Skibet imorges. *13de* S. V. 2. Graat. En Rødkælk og nogle Lærker paa Dækket imorges. *29de* S. S. V. 4. Regn. Et Par store Flokke af Trækfugle saas idag trække mod S. S. V.; c. 20 Gæs fløj mod Ø. — November: *1ste* N. N. V. 4. Regn. Krager ses af og til i Nærheden af Skibet. *20de* N. V. 5. Regnbyger. En lille Sangfugl, vistnok en Rødkælk, saas hoppe om paa Dækket idag. — December: *4de* S. V. 3. Regn. Nogle Solsorter kredsede om Skibet imorges. — I December Maaned er der en Mængde Maager, der opholder sig i Nærheden af Skibet; de gøre ivrigt Jagt paa alt Affald, der kastes over Bord, hvilket ofte foranlediger større Slagsmaal mellem dem. — A. H. Schmidt.

Horns Rev Fyrskib. Februar: *10de* Vind 0. Dis. Smaa Flokke af Lærker fløj Ø. efter hele Dagen. *11te* Ø. S. Ø. Omtrent

(1912.)

200 Lærker ved Fyret inat; Kl. 8 Morgen fløj de bort mod Ø. *22de* S. S. Ø. Taage. Flere Flokke Fugle, antagelig Stære, kredsede rundt om Skibet ved Daggry og fløj mod Ø. Opad Dagen S. Graat. En Flok Raager, 16 Stkr., kom fra V. og fløj mod Ø. *26de* S. S. V. Graat og Taage. Omkring 150 Fugle ved Fyret inat, Viber, Stære, Raager, Solsorter og enkelte Lærker; saa snart der blev givet Taagesignal, fløj Fuglene bort, kun nogle enkelte Raager og Stære forbleve paa Skibet til Middag. — Oktober: *9de* S. Ø. Klart. Enkelte Smaafugle og en Høg ved Skibet; 5 Krager fløj mod Ø. *13de* Ø. Skyet. En Flok Krager, c. 30 Stkr., fløj mod S. V. — Søjborg.

Bovbjerg Fyr. Januar: *7de* Kl. 2 Eftm. fløj 2 Svaner mod N. — Første Halvdel af Januar var der en Masse Bogfinker i Haverne ved Fyret. — Februar: *22de* Ø. S. Ø. 2. Dis med Gennembrud af Solen. Lærken sang; flere Viber og Stæren saas første Gang igaar. — Store Flokke af Viber paa Engene i Efteraaret helt til Jul, ligeledes enkelte Vindrosler. — C. Rude.

Thyborøn Fyr. Intet Fuglefald. Januar: *11te* S. S. Ø. Skyet. 1 Rødben paa Stranden. — Februar: *18de* S. S. V. Diset. Tre Strandløbere paa Fjordstranden. *20de* S. S. V. Diset. 4 Viber trække mod S. *22de* S. til Ø. Taage. En Flok Stære ved Taarnet. *26de* S. V. Diset. Flere Flokke Krager trække mod S. — Marts: *17de* S. Ø. Diset. Flere Flokke Krager trække mod N. *18de* S. Ø. Diset. Flere Flokke Krager trække mod N. Ø. — April: *19de* S. Ø. Skyet. Store Flokke Krager trække mod N. Ø. hele Dagen. *21de* S. Ø. Skyet. 19 Krager i en Flok trække mod N. Ø. — August: *26de* V. N. V. Byger. En Flok Vildgæs trække fra Havet ind ad Kanalen. *31te* V. N. V. Byger. Vildgæs trække fra N. — September: *2den* S. Regn. Store Flokke Vildgæs trække fra N. *3dje* S. Ø. Skyet. Store Flokke Vildgæs trække fra N. *4de* S. Regn. Store Flokke Vildgæs trække fra N. *7de* N. V. Skyet. Vildgæssene trække fra N. *11te* Ø. Skyet. Store Flokke Vildgæs trække fra N. — Oktober: *11te* S. Skyet. Store Flokke Vildgæs trække fra N.; enkelte Krager trække fra N. Ø. *21de* Ø.

(1912.)

Diset. 4 Svaner trække mod S. *23de* Ø. S. Ø. Regn. 1 Svane trak mod S. *24de* Ø. S. Ø. Regn. Store Flokke Vildgæs trække mod S. — S. Nielsen.

Lodbjerg Fyr. Februar: *20de* 2 Viber ved Taarnet om Middagen. *23de* en Solsort set i Haven om Eftermiddagen; Viben hørt i Nærheden af Taarnet før Midnat. — Marts: *11te* en Rødkælk set i Haven om Dagen. — April: *15de* V. N. V. 2. Skyet. 16 Graagæs fløj mod N. Kl. 9½ Form. — Maj: *5te* N. 2. Skyet. Svalen set ved Fyret om Dagen. — P. S. Pedersen.

Hirtshals Fyr. Oktober: *3dje* en Skovsneppe faldt; det er den eneste Fugl, der er faldet her iaar. — H. Hinrichsen.

Højen Fyr. Februar: *27de* V. S. V. 3. Overtr., diset. Viben og Lærken hørt. — Intet Fuglefald ved Fyret. — A. T. Friis.

Skagen Fyr. Februar: *25de* N. N. V. 2. Overtr. Set 3 Viber; Lærken hørtes slaa. — April: *15de* V. S. V. 4. Overtr. Den første Graa Vipstjert saas. *22de* N. Ø. 2. Klart. De første Storke saas. — Maj: *12te* S. V. 5. Skyet. Gøgen hørtes første Gang, dog var den set en halv Snes Dage i Forvejen. — August: *21de* set Gøg og Svaler. — September: *3dje* set den sidste Gøg. *12te* en Aalekrage satte sig paa Gelænderet; ihjelsloges. — Oktober: *7de* en Mursvale fløj omkring i Gaarden. — November: *9de* 6 Sangsvaner i en Vandpyt tæt ved Fyret; 1 blev skudt. — I Almindelighed bemærkes: Foranlediget ved de vedholdende sydlige Vinde i Begyndelsen af Vinteren havde Grenen afsat en lang Spids bøjende mod V., hvorved der fremkom ligesom en lille Havn, hvori der stadig opholdt sig en Mængde Ederfugle og Ænder. Da Vinteren strængedes, søgte ogsaa en Mængde Knortegæs til Kysten og vare, særlig om Morgenen, naar de søgte ind paa Land, lette at komme paa Skudhold. Egenligt stort Fugletræk om Foraaret mærkedes ikke, ligesom den Mængde af Høge, Musvaager og andre Rovfugle, der plejer at ledsage Trækket, ikke saas; i det hele observerede vi kun 3 Stkr. Snepperne hørtes enkeltvis svirrende om Natten. Der holder altid en Mængde Gøge til her paa Egnen og ofte kan en halv Snes Stkr. ses paa en Gang, særlig i Efter-

sommeren. Efteraarstrækket var kortvarigt og ikke stort, og navnlig savnede jeg den Mængde Kongefugle, der ellers plejer at vise sig om Lanternen i Oktober og November. — E. Wielandt.

Skagens Rev Fyrskib. Januar: Stadig set de sædvanlige Fugle — Maager, Ænder og Alke. Februar: *17de* S. V. 2. Taage. En Stær og enkelte Lærker vare her ved Skibet hele Døgnet. *26de* S. V. 3. Overtr. Enkelte Stære vare ved Skibet. *27de* V. 3. Overtr. Taage. Flokke af Krager fløj mod V.; flere Stære og Lærker fløj her ved Skibet. *29de* S. S. V. 3. Diset og Taage. 2 Viber vare her ved Skibet. — Marts: *1ste* 2. Skyet. Lærker sang her ved Skibet. *2den* S. S. V. 3. Overtr. Krager, Lærker og andre Fugle observeredes af og til hele Dagen. *4de* S. Ø. 4. Skyet. Flere Lærker, Krager og enkelte Stære fløj forbi Skibet i Løbet af Dagen. *21de* S. S. V. 3. Skyet. Flere Lærker vare her i Løbet af Dagen. — Juni: Sidste Halvdel af Maaneden observeredes flere Flokke af Ænder trækkende mod Ø. — Juli: Flere Flokke af Ænder observeredes af og til trækkende i forskellige Retninger, ligeledes i den følgende Maaned. — Oktober: *5te* V. 4. Overtr. Store Flokke af Alkefugle fløj i alle Retninger. *7de* S. V. 4. Overtr. Store Flokke af Alkefugle fløj i alle Retninger. *12te* S. V. 2. Overtr. Ligeledes. *14de* S. S. Ø. 3. Overtr. Enkelte Krager fløj forbi Skibet i vestlig Retning. *17de* S. 4. Overtr. Enkelte Krager fløj i vestlig Retning; store Flokke Alkefugle fløj i alle Retninger. *30te* S. S. V. 2. Skyet. En Masse sorte og graa Ænder laa paa Vandet i en Strømskelning. — November: *18de* S. V. 2. Overtr. Store Flokke af Ænder i alle Retninger. *22de* S. V. 3. Store Flokke af Ænder fløj i alle Retninger. — December: *15de* V. 6. Overtr. Flere Tusinde Ænder fløj i vestlig Retning. *31te* flere forskellige Slags store Maager have i sidste Del af Maaneden været her omkring Skibet. — Da Fyret er rødt og altsaa ikke noget skarpt Lys, er det yderst sjeldent, at der falder Fugle her. — A. P. Jensen.

Nordre Rønner Fyr. Januar: *12te* 3 Svaner fløj mod S. V. *13de* 4 Svaner fløj mod Ø. *14de* 4 Svaner mod Ø. *22de* 4 Svaner

(1912.)

mod Ø.; samme Dag 10 Svaner mod Ø. — Februar: *16de* Stæren set første Gang. *24de* Viben set. *25de* Præstekraven set; 6 Krager fløj mod N. Ø. *26de* Tejsterne sete, dog kun enkelte. — November: *6te* 7 Svaner og derefter 4 Svaner i Flugt mod S. V. *7de* 4 Svaner og senere atter 4 Svaner fløj mod S. V. *20de* flere hundrede Sortænder og Søpapegøjer opholdt sig S. for Øen. *25de* Søpapegøjer og Alke i store Flokke S. for Øen. *26de* 6 Svaner opholdt sig paa Nordsiden af Øen. — December: *14de, 15de* og *16de* opholdt store Flokke af Havmaager, Skarve, Knortegæs og Skalleslugere sig paa Nordspidsen af Øen. — L. F. Madsen.

Læsø Trindel Fyrskib. Januar: *23de* S. V. 2. Fin Sne. 5 Svaner fløj mod Ø. — Februar: *17de* S. V. 2. Taage. En Stær opholdt sig paa Skibet. — Marts: *3dje* S. 3. Overtr. Flere Flokke Krager mod N. Ø. — Oktober: *4de* S. S. V. 2. Klart. Flere Flokke Krager mod V. *8de* N. V. 5. Klart. Krager i hundredevis mod V. *9de* N. Ø. 2. Klart. Krager i hundredevis mod V. *16de* S. V. 2. Skyet. Krager i tusindevis mod V. mellem 7 og 8 Form. *20de* S. S. Ø. 6. Overtr. Flere tusinde Krager fløj mod V. mellem 7 og 8 Form. *24de* Ø. S. Ø. 9. Overtr. 3 Svaner fløj mod S. V. — November: *5te* Ø. 3. Skyet. 5 Svaner fløj mod S. V. *6te* S. V. 2. Overtr. 9 Svaner fløj mod S. V. — J. C. Andersen.

Læsø Rende Fyrskib. Oktober: *2den* N. N. V. 5. Skyet. Flere Krager fløj mod V. *3dje* N. N. Ø. 4. Snebyger. Flere Flokke Krager fløj mod V. *15de* flere Flokke Krager fløj mod V. — P. C. Grumsen.

Østre Flak Fyrskib. Februar: *27de* S. V. 2. Taage. Flere Krager saas i Løbet af Dagen. — Marts: *23de* S. S. Ø. 3. Overtr. En halv Snes Bogfinker var ved Skibet en Time efter Middag. — September: *20de* N. V. 1. Skyet. En Flok (c. 10) hvide Vipstjerte opholdt sig ved Skibet om Aftenen ved Fyrets Tændingstid. — Oktober: *14de* S. 3. Overtr. Om Morgenen hvilede endel Krager sig paa Skibet; senere fløj de bort med V. *20de* S. Ø. 6. Overtr. Mange Krager fløj mod V. — December: *6te* S. 3.

(1912.)

Skyet. 4 Svaner fløj mod Ø. — I omtrent hele December Maaned have store Mængder af Ænder opholdt sig her i Nærheden af Fyrskibet. — C. Knudsen.

Hals Barre Fyr. Oktober: *27de* 10 Svaner fløj tæt forbi Fyret, kommende fra N. V. — I November og December holdt mange Ederfugle til ved Fyret. — M. Jørgensen.

Anholt Knob Fyrskib. Marts: *6te* S. S. V. 5. Overtr. Enkelte Krager trak mod Ø. *18de* Ø. S. Ø. 5. Skyet. Smaafugle paa Dækket hele Dagen. — April: *17de* S. Ø. 2. Skyet. Enkelte Vipstjerte og Rødkælke opholdt sig hele Dagen paa Skibet. *18de* S. Ø. 2. Skyet. Enkelte Vipstjerte og Rødkælke opholdt sig atter idag paa Skibet hele Dagen. *19de* S. Ø. 2. Klart. Enkelte Rødkælke og Drosler opholdt sig hele Dagen paa Skibet. *20de* N. N. Ø. 2. Klart. En Flok Ederfugle (10 Stkr.) fløj fra V. mod S. Ø. — Th. Andresen. — November: *9de* N. V. 2. Overtr. Store Flokke af Smaafugle fløj i sydlig Retning. — Krogsbæk.

Hesselø Fyr. Marts: *4de* Gravand og Vibe ankomne. *9de* Strandskaden ankommen. — E. P. Sonne.

Spodsbjerg Fyr. Intet Fuglefald ved Fyret, og ser det ud, som om Strandfuglene ere i stærk Aftagende her paa Isefjorden. — P. Christensen.

Schultz's Grund Fyrskib. Januar: *26de* fløj 8 Svaner mod Ø. fra S. V. *30te* og *31te* opholdt store Flokke Gæs og Ænder sig i Nærheden af Skibet. — Marts: *3dje* en Flok Aalekrager. 10 til 12 Stkr., kom fra S. og fløj mod N. V. *20de* flere Flokke Krager fløj om Eftermiddagen mod S. V. — Maj: *3dje* store Flokke Ederfugle, Gæs og Ænder af forskellig Slags opholdt sig her. — September: Omtrent hver Dag ses i denne Maaned Aalekrager flyve forbi i alle mulige Retninger. — Oktober: *8de* 15 Krager fløj mod S. V. — November: *3dje* 5 Svaner fløj mod V. *21de* 3 Svaner fløj mod Ø. — December: Som oftest opholder der sig i denne Maaned mange Ænder og Gæs i kort Afstand fra Skibet. — P. Larsen.

Fornæs Fyr. Januar: *27de* S. V. 2. Skyet. 15 Skarve fløj

(1912.)
forbi Fyret fra N. til S.; 8 Svaner, kommende fra N., fløj mod S. *28de* S.V. 2. Skyet. 5 Svaner, kommende fra S., fløj mod N. — Februar: *1ste* N.V. 3. Skyet. 2 Svaner svømmede i Havet N. for Fyret; ved Opjagning fløj de mod S. *9de* Ø.S.Ø. 2. Skyet. 12 Regnspover fløj langs med Strandkanten fra N. til S. *11te* N.Ø. 3. Klart. 20 Svaner fløj fra N. til S.; flere Flokke Knortegæs samt mindre Ænder fløj i alle Retninger. — Marts *8de* S.V. 3. Skyet. 4 Aalekrager fløj forbi Fyret fra N. til S.; 7 Stkr. Vildgæs fløj i samme Retning. — April: *4de* første Svale. — Maj: *1ste* stille, skyet. 3 Strandskader fløj forbi Fyret fra S. til N. om Formiddagen; om Eftermiddagen S.Ø. 2. Skyet. 2 Strandskader fløj forbi Fyret fra N. til S. *6te* S.Ø. 2. 11 Skarve fløj forbi Fyret fra S. til N. *9de* S.Ø. 2. 3 Skarve fløj forbi Fyret fra S. til N. — Oktober: *18de* V.N.V. 3. Overtr. 5 Svaner kom fra N.; tværs af Fyret drejede de om og fløj mod N.Ø. — Daglig er her større og mindre Flokke af Ederfugle, som trække baade mod N. og S. Gravanden, som i tidligere Aar har haft Stade her, er nu efter Motorens Indførelse i alle Fiskefartøjer forsvunden, da Aarsagen maa være den, at Ungerne blive jagede og skudte forinden de kunne flyve, ligesom de gamle blive dræbte, inden de have lagt Æg. — Her har i dette Efteraar ikke været Fugle ved Fyret, eller i det hele taget været observeret Fugle i Træktiden. — A. Kruse.

Hjelm Fyr. Februar: *18de* set Aarets første 3 Stære. *19de* set 2 Viber. — Marts: *20de* Maagerne begynde at komme. — Det bemærkes, at her ikke har været Spor af Fugletræk i afvigte Efteraar. — A. Jensen.

Ebeltoft Vig Fyr. Intet Fuglefald her ved Fyret iaar. — H. P. Mønsted.

Sejrø Fyr. Februar: *27de* saas Strandskaden og Præstekraven i Stranden ved Fyret. — Fra først i Oktober trak daglig Ederfugle og andre Dykænder over N.V.-Revet, dog ikke i større Flokke, ej heller har disse Fugle opholdt sig dykkende paa Revet som foregaaende Aar. — N. J. Z. Nielsen.

(1912.)

Vestborg Fyr. Februar: *24de* saas en stor Flok Viber; Stærene have været her ret længe. — September: Der er næsten hver Nat i denne regnfulde Tid en Mængde Smaafugle paa Ruderne; kun faa faldt. — P. W. Sørensen.

Lappegrundens Fyrskib. Januar: *5te* S. Ø. Skyet. En Flok Ederfugle fløj mod V. — April: *12te* N. Ø. Skyet. En Flok Ederfugle fløj mod Ø. — Oktober: *6te* Smaafugle rundt om Fyrskibet. *10de* ligeledes. *13de, 14de, 15de* og *16de* Træk af Ænder i forskellige Retninger. *28de* Smaafugle om Fyrskibet. — J. C. Jensen.

Kronborg Fyr. I indeværende Aar har intet Fuglefald fundet Sted ved Fyret og intet Fugletræk af Betydning er iagttaget. — H. B. J. Reinwald.

Middelgrundens Fyr. Intet.

Trekroner Fyr. Intet Fuglefald i 1912. — H. E. Andresen.

Nordre Røse Fyr. Januar til Maj: Intet Fuglefald. — J. F. Hansen. — Juli—September: Intet Fuglefald. — Oktober: *24de* Ø. S. Ø. 10. Overtr. 13 Ederfugle trak mod V. over Sundet. *25de* Ø. S. Ø. 9. 7 Ederfugle trak mod V. over Sundet. *26de* S. Ø. 4. 17 Svaner trak over mod Saltholmen. — November: Enkelte Flokke Ænder og Ederfugle trække frem og tilbage i alle Retninger i Sundet; Smaaflokke af begge Slags ses af og til svømme i Nærheden af Fyret. — December: Enkelte Flokke Ænder og Ederfugle ses svømme i Farvandet og af og til trækker en Flok fra den ene Side af Sundet til den anden. — Ingen Slags Fugle er set paa Ruderne eller faldet. — H. S. L. Madsen.

Drogden Fyrskib. September: *6te* mange Ænder og Ederfugle i Farvandet. — Oktober: *21de* Ø. S. Ø. 3. Skyet. En Flok Vildænder fløj mod V. — November: *24de* S. V. 3. Dis. En Flok Alkefugle fløj mod N. V. — December: *18de* S. V. 4. Regn og Dis. En Flok Alkefugle fløj mod N. Ø. *19de* V. Skyet. En Flok Alkefugle fløj mod S. V. *22de* S. V. 2. Dis. En Lærke ved Skibet Kl. 8 Form. *28de* S. S. Ø. 4. Regnbyger. En Lærke ved Skibet Kl. 8 Form. — Her paa Stationen mærkedes For- og Efteraarstrækket saa godt som slet ikke i 1912. — N. J. Kromann.

(1912.)

Refsnæs Fyr. Hele Vinteren store Flokke af Ederfugle, Sortænder, Lysænder, Bjergænder, Havlitter, enkelte Fløjlsænder og Brunnakker paa Revet. — Februar: *18de* saas Viben og Stæren første Gang. — Marts: *24de* de første Ederfugletræk mod N. — September: *20de* en stor Flok Ederfugle opholder sig paa Revet og omkring d. *28de* var der flere Knortegæs mellem samt nogle Graaænder. — Oktober: *1ste* store Flokke Skovkrager trak mod V. samt endel Bogfinker og Stære. *24de* 8 Svaner fløj fra N. Ø. mod S. V. — December: Hele Maaneden vare store Flokke af Ederfugle, Sortænder, Havlitter, Lysænder, Fløjlsænder, Alkefugle, Søpapegøjer og nogle Graaænder stadig paa Revet. Enkelte Aalekrager ere skudte her. — C. F. V. Jensen.

Romsø Fyr. Intet Fuglefald i Aarets Løb. — H. Würtz.

Halskov Fyr. Intet Fuglefald i 1912. — C. P. Henningsen.

Sprogø Fyr. Januar: *13de* 5 Svaner paa Vandet N. for Øen. *15de* 8 Svaner fløj mod S. Ø. *21de* omtrent 100 Lysænder ved Kysten. *28de* 6 Svaner mod Ø.; 5 Svaner paa Vandet ved Øen. — Februar: *4de* 17 Svaner fløj fra Ø. mod V. *26de* stort Kragetræk fra Fyn til Sjælland. — Marts: *17de* kom Hættemaagerne paa Ynglepladserne. *18de* kom Strandmaagerne til Ynglepladsen. — April: *23de* saas de første Hættemaageæg. *28de* saas de første Strandmaageæg. Maj: *12te* saas de første Svaler. *31te* en Stork fra Ø. til V. — Juni: *20de* saas de første Strandmaageunger. — August: *15de* vare alle Strandmaager forsvundne fra Øen. *19de, 20de* og *21de* Kragetræk fra Sjælland til Fyn. — Oktober: *23de* store Flokke Raager fra Fyn til Sjælland. *24de* saas en Flok Ederfugle paa c. 1000 Stkr., udelukkende Hanner, de første iaar. — November: *9de* var en stor Flok Ederfugle tæt inde ved Øen langs Stranden; det er ellers sjeldent, og kun naar de ere saarede, at Ederfugle i større Flok gaa saa tæt til Land. *12te* stort Træk af Ederfugle. — Det har i det forløbne Efteraar været meget sparsomt med Svømmefugle, antagelig fordi Jagten mere og mere drives fra Motorbaade, hvorved Fuglene intet Øjeblik lades i Fred. Fugletrækket forbi Fyret i 1912 har ogsaa været sparsomt. — A. V. Hansen.

Helholm Fyr. Januar: *23de* Stæren set. — Februar: *18de* Gravanden og Viben sete. — Af Fugle, som ruge her, maa anføres Gravanden, Graaanden, Skalleslugeren, Viben, Strandmaagen, Ternen og Strandskaden. Intet Fuglefald. — P. Larsen.

Omø Fyr. Januar: *19de* S. Ø. 5. En Flok Svaner, c. 20 Stkr., slog sig ned ved Fyret. — Februar: *18de* Viben og Stæren saas første Gang. — April: *20de* Ø. Klart. Storken kommet. — November: *1ste* og *2den* N. V. Storm. Store Flokke af Ederfugle opholdt sig i Farvandet omkring Fyret. — P. F. Köhler.

Vejrø Fyr. Under Isperioden fra 15de Januar til Slutningen af Februar holdt store Flokke af Dykænder til i de paa Grundene værende Vaager; af og til mindre Flokke af Svaner. — Februar: *18de* S. 2. Taage. Lærken set. *20de* S. V. 2. Diset. Stæren og Viben sete. — Marts: *4de* S. V. 3. Overtr. Dis. Endel Rovfugle paa Øen, hvilket tyder paa et større Fugletræk om Natten. *15de* Graaanden kommet. *27de* S. S. V. 4. 8 Svaner fløj mod Ø. — Efteraaret har ikke givet Lejlighed til Noteringer om Fugletræk; i det hele taget synes Øen ikke at spille nogen nævneværdig Rolle for Fuglene, hvad vel hidrører fra Øens nære Beliggenhed ved større Fastland — Lolland og Sjælland. — C. A. Hansen.

Taars Fyr. Intet Fuglefald i 1912. — W. Pedersen.

Albuen Fyr. Intet Fuglefald i 1912. — H. K. Hansen.

Strib Fyr. Februar: *20de* Stæren set siddende paa Fyrets Altan. — Juli: *18de* mange og store Flokke Himmelhunde trak mod S. Vinden N. Ø. 2. Regnbyger. — November: *4de* S. S. V. 2. Diset. Om Aftenen trak en stor Flok Vildgæs mod S. — Intet Fuglefald her i 1912. — A. H. Andersen.

Baagø Fyr. Intet Fuglefald. — N. Hansen.

Assens Fyr. Intet Fuglefald. — N. Lund.

Helnæs Fyr. Januar: *13de* S. og S. Ø. 6. Frost. Flokke af Ederfugle ud for Fyret i Farvandet. *17de* Ø. 5. Skyet. Grødis langs Kysten. Der observeredes Krikænder langs Strandbredden i Grøden. *21de* Vind 0. Skyet. Ederfugle og Havlitter langs Kysten; endel Blaakrager langs Stranden. *23de* Ø. 1. Taage. To store

(1912.)
Sværme af Ederfugle observeredes i Farvandet; Andetræk fra N. mod S. og Gæs trækkende mod V. S. V. *27de* N. Ø. Klar Luft. Stadig Træk af Ederfugle snart fra N. snart fra S. ude over Farvandet. — Februar: *3dje* Vind 0. Skyet Luft. Isflager i Bæltet. Sværme af Ederfugle og forskellige Andearter imellem Ismasserne. *5te* S. Ø. Klart. Bæltet tildels islagt. I Vaagerne Ederfugle og andre Dykænder; langs Stranden enkelte Krager. *6te* Ø. S. Ø. 5. Overtr. og diset. Alle Slags Søfugle saas, tildels enkeltvis, mellem de omdrivende Isflager. *12te* Vind 0. Overtr. 7 Svaner trak mod S. langs Strandbredden; Smaaænder vise sig stadig langs Iskanten paa Stranden. — September: *10de* N. V. Bygevejr. Svalerne saas flokke sig om Taarnet. *13de* V. Skyet. Ingen Svaler lod sig mere se. — Oktober: *26de* S. Ø. 4. Overtr. Svaler observeredes langs Klinterne ved Kysten. — November: *18de* Vind 0. Taage. Kl. 10^{15} Form. observeredes for første Gang i Efteraaret Ederfuglene langs Strandkanten i større Mængder; Havlitternes Skrig hørtes. *20de* N. V. 2. Let skyet. 5 Gæs saas ud over Farvandet, dragende mod S. — December: *15de* V. S. V. 9. Regn. Der observeredes endel Ænder, der med Mellemrum droge mod S. langs Kysten. *30te* V. 5. Overtr. 5 Gæs saas dragende mod S. tæt langs Farvandet om Formiddagen. — A. C. G. Grove-Stephensen.

Hammeren Fyr. Januar: *23de* N. 3. Diset og skyet. 9 Aalekrager trak mod Ø. — September: *19de* N. Ø. 3. Klart. Ederfugle og sorte Ænder ses i Flokke trækkende mod V. *24de* Ø. N. Ø. 6. Klart. En Flok Graagæs trak mod V. Paa Slutningen af Maaneden, fra den 24de, ses dagligt Træk af Ederfugle og Gæs mod V. — Oktober: *9de* N. Ø. 2. Klart. Omtrent 50 Knortegæs trak mod V. — November: *8de* S. V. 8. Diset og Regn. 6 Svaner fløj mod S. V. — A. M. Dam.

Dueodde Sydfyr. April: *20de* N. Ø. 2. Skyet, klart. 23 Svaner trak mod N. Kl. 11 Form. *26de* N. V. 2. Skyet, klart. Omkr. 40 Svaner trak mod N. Kl. 12 Middag. *27de* N. V. 3. Skyet, klart. 16 Svaner trak mod V. Kl. 11 Form. — Edw. Lund.

Møen Fyr. Februar: Endel Havlitter og enkelte Graaænder

opholde sig her og et ikke ringe Antal bliver skudt; enkelte Svaner ses af og til og Maager ere her ofte mange af. — H. P. Jensen.

Harbølle Pynt Fyr. Intet Fuglefald. — A. J. Olsen.

Gedser Fyr. Januar: *6te* kom flere Flokke Svaner fra Ø. og satte sig paa Rødsand, hvor der for Tiden er flere hundrede Svaner samlede. — Februar: *10de* kom flere store Flokke Svaner fra V. over Gedserodde og fortsatte mod Ø. — August: *22de* kom c. 50 Storke inde fra Landet og opholdt sig nogen Tid paa Gedserodde; af og til fløj de et Stykke ud over Søen og vendte atter tilbage; hen mod Aften forsvandt de igen ind over Land. — Siden 1ste Oktober har her intet Fuglefald været. — J. P. Nielsen.

Gedser Rev Fyrskib. November: *20de* V. 4. Overtr. En Mængde Havlitter i Skibets Nærhed. — K. P. F. Hald.

Hyllekrog Fyr. Januar: *10de* stille og klart. Der er idag ialt observeret 67 Svaner, den største Flok var paa 17 Stkr., kommende fra N. Ø. og trak mod S.; de øvrige Flokke vare paa 3 til 7 Stkr. og fløj i forskellige Retninger. *12te* S. S. Ø. 7. Skyet. Idag observedes adskillige Flokke Svaner. En Flok paa 21 Stkr. fløj fra Ø. mod V. En Flok paa 11 Stkr. fra N. mod S. V.; de øvrige i forskellige Retninger. *15de* S. Ø. 4. Skyet. Idag observeredes ialt 37 Svaner flyvende i alle Retninger; største Flok paa 9 Stkr. *16de* Ø. 6. Skyet. I Dag observeret mange forskellige Flokke Svaner, flyvende i alle Retninger *17de* Ø. 6. Skyet. Idag ved Middagstid kom en stor Flok Svaner, c. 50 Stkr., og satte sig paa Isen tæt ved Fyret; kort efter fløj de bort i østlig Retning. *20de* Ø. 2. Klart. Store Flokke Svaner fløj idag i alle Retninger, de fleste mod Ø.; Antal kunde ikke opgives. — Der har intet Fuglefald været her i Foraaret. Følgende Fugle have vist sig her i Foraaret: Atlingand, Skeand, Rødnakke, Lille Regnspove, Præstekrave, Knortegaas og Klyde. Af Fugle, der ruge her, kunne nævnes: Store Havmaager, Strandmaager, Graaænder, Skalleslugere, Strandskader, Gravænder, Terner og en enkelt Hættemaage. — August: *10de* V. S. V. 3. Skyet. Mod Aften observeredes herfra store Flokke

(1912.)
Regnspover, kommende fra N. Enkelte forbleve Natten over paa Øen, de øvrige fortsatte i sydvestlig Retning. — Oktober: *9de* N. Ø. 2. Klart. 7 Svaner, kommende fra Ø., trak hen over Øen i sydvestlig Retning. *23de* Ø. 6. Overtr. 11 Svaner trak idag over Øen fra N. Ø. mod S. V. — December: *1ste* N. V. 2. Overtr. Regn. En større Flok Brokfugle (Hjejler), kommende fra N., slog sig ned paa Øens vestlige Spids og forblev der saa længe det var Dag; næste Morgen saas kun nogle enkelte Stkr. paa samme Sted. — Der har intet Fuglefald været iaar. — J. N. B. Høeg.

Meddelelser om mindre almindelige danske Fugle.

Phalacrocorax graculus.

En Topskarv, ung Hun, dræbtes 10de November 1912 ved Skagens Rev Fyrskib (Sml. S. 192).

Phalaropus fulicarius.

En Thorshane, ung Hun, faldt 19de Oktober 1912 ved Skagens Fyr (Sml. S. 186).

Larus glaucus.

En Graamaage, ung Hun, blev skudt af Hr. N. Monberg 31te December 1912 i Sundet udfor København; ogsaa 22de Januar 1910 havde han sammesteds skudt en ung Graamaage; begge Fuglene forærede han til Zoologisk Museum.

Lestris longicauda.

En Lille Kjove, ung Han, faldt 11te September 1912 ved Vestborg Fyr (Sml. S. 178).

Parus cristatus.

En lille Flok Topmejser (c. 10 Stkr.) saas 27de Januar 1913 i Selskab med Fuglekonger i Stenholt Krat nær Bølling Sø, Moselund (Docent R. Hutzen Stamm).

(1912.)

Luscinia suecica.

En Blaakælk med straalende blaa Strube iagttoges 20de Maj 1912 ved Amager Fælled (Docent R. H. Stamm).

Fra Færøerne.

Tveraa Fyr. Intet Fuglefald. — E. B. Jacobsen.

Sumbø Fyr. Oktober: *16de* V. 6. Skyet. Nogle Stære paa Ruderne; 1 faldt (ikke indsendt). Fra 16 Oktober til de første Dage i November vare store Flokke af Smaafugle i Nærheden af Fyret. — December: *23de* S. S. Ø. 4. Byget. Efter Mørkets Frembrud fangede Fyrpasseren en Søkonge paa Marken N. for Fyret. — J. Jacobsen.

Tofte Fyr. Intet Fuglefald. — S. Thorkildshøj.

Myggenæs Fyr. Intet Fuglefald — D. Olsen.

10.—4.—1913.

Echinological Notes.

By

Dr. *Th. Mortensen.*

V. The Phylogeny of the Echini. A critical essay.

Professor R. T. Jackson, the author of the "Phylogeny of the Echini", has expressed the desire of seeing his work[1]) reviewed by me. With pleasure I take the task upon me. Though the echinological literature has, especially in recent times, received many very important contributions, this work represents a rather unique enrichment of this branch of science, equally remarkable through its magnificent appearance and its high scientific value. To review such a monumental work is in itself both a pleasure and a honour.

Meantime Prof. H. L. Clark has published in "Science", June 28. 1912, an elaborate review in which he gives a rather detailed summary of the contents and the more prominent results of the work. I must join Professor Clark sincerely in his deep appreciation of the work and in his admiration for the eminent skill and unsurpassed industry and perseverance of the author; but the appearance of his review makes it superfluous for me to give likewise a summary of the contents of the work, which could not avoid being essentially a repetition of what H. L. Clark has already said. Probably also Prof. Jackson will prefer, instead of receiving another eulogy in similar terms from my hand, to have a criticism

[1]) Robert Tracy Jackson: Phylogeny of the Echini, with a Revision of Palæozoic species. Mem. Boston Soc. Nat. Hist. Vol. 7, 1912. (With 76 Plates).

of his work, pointing out some objections which may be raised against some of his conclusions.

One of the most prominent features of the work of Professor Jackson is the combined study of recent and fossil forms, and of both young and grown stages. It ought not to be necessary to point out, that this is really the only way to reach a full understanding of the interrelations of the different groups of Echini; scarcely anybody would deny that. But in reality some echinologists study the fossil forms, others the recent — perhaps not because they regard their own specialty as the most important, but because it is mostly connected with almost insuperable difficulties to procure material for the study of both. Prof. Jackson has overcome all difficulties. With an energy that demands the highest admiration he has got together a material of some recent forms so extraordinary, that scarcely any Museum-collection can compete with him. Thus he has brought together no less than 33,000 specimens of *Strongylocentrotus drøbachiensis*, 2,643 specimens of *Toxopneustes atlanticus*, 1,163 of *Paracentrotus lividus*, 754 of *Echinometra lucunter* etc., — and every single specimen has been carefully examined and tabulated. On the other hand he has studied a very large part of the material of Palæozoic Echini existing in both American and European collections. No wonder that he has reached results of unusual interest and importance.

Of course other echinologists also have taken both fossil and recent forms into consideration; I might name e. g. Desor, Duncan, Lambert, H. L. Clark and Döderlein, and I also venture to think that I have myself not disregarded the fossil forms in my efforts to reach a natural classification of the Echini. But Jackson by far surpasses all in this regard. Still I might venture to say that it is evident that Jackson is first a specialist in the fossil forms. It is felt more than once on reading his work, that his knowledge of the recent Echinoids is not quite comprehensive, and his conclusions are sometimes influenced thereby. It is a fact that specialists on fossil Echini are often inclined to regard only such characters as

of value for the classification of the Echini upon the whole, which are liable to be preserved in the fossils — and Prof. Jackson is not free from viewing matters in this way either. Thus he does not ascribe any classificatory value to the minor structural details of pedicellariæ and spicules, which have proved to afford such a wonderful richness of constant characters within several groups of Echinoids. If he had studied a fair number of recent forms also with regard to these structures, he would scarcely have failed to see that they do really afford characters of classificatory value, which ought not to be neglected. He would then certainly not have confounded all the *Diadema*-species into one after the old fashion, and neither would he then have maintained the genus *Strongylocentrotus* in the wide sense, in which Agassiz used it, but which scarcely any specialist on recent Echini of some consideration accepts any more. He would then e. g. have found, how the pedicellariæ and spicules are of a very characteristic structure in all those forms, where the gill-cuts are sharp and deep, which decidedly indicates that these forms are really nearer related to each other. — I must emphasize again, as I have done before, that all characters must be taken into consideration, when the real interrelations of the Echini (— or any other kind of animals —) are sought for. Jackson certainly states that "every part of an organism is worthy of careful study", but he adds immediately that "to base classification on such minutiae of no known evolutionary value is undesirable" (p. 199). I cannot but regard it as inadmissible to declare beforehand some structure or other as of no value for classification. If it is found that the microscopic structure of pedicellariæ and spicules are of classificatory value among the recent Echini, the necessary conclusion is that the fossil forms are in this respect incompletely preserved (— even though the pedicellariæ may sometimes be found preserved also in the fossil forms, as has now been found by Jackson even in a Palæozoic form, *Meekechinus elegans* —). Neither is it admissible to claim the uselessness of such structures, because they offer perhaps some

difficulty for study. If such a principle had to prevail in classification, I wonder what e. g. the students of Nemerteans would say, who must cut their objects into sections, before they can reach certainty in the identification.

It may not be superfluous, however, to state that I do not think the pedicellariæ had any essential bearing on the classification of the Palæozoic Echini. The structural features of the test are there so wonderfully diversified that we have therein the best possible guide to their affinities, and Jackson has made use of this guide in the best possible way. A quite different thing is it in such highly specialized groups as the Camarodonta, where the test structure is of great uniformity. If here the microscopical structures are neglected, the result becomes the association of a number of, in reality, widely different forms in a single genus, as "*Echinus*" and "*Strongylocentrotus*", or family, as the "Strongylocentrotidæ". Here Jackson's classification in my opinion decidedly represents a step backwards.

One of the most important conclusions with regard to the morphology of the test of the Echini arrived at by Professor Jackson is this, that the interambulacra have not the value of a separate morphological part of the test corresponding to the ambulacra; the test (corona) is not, as generally supposed, divided into 10 areas, 5 ambulacra and 5 interambulacra, but only into 5 areas, each consisting of an ambulacrum joined along each side by a half-interambulacrum. The interambulacral plates do not develop at the sides of the genital plates, but at the sides of the ocular plates. Accordingly the genital plates are regarded as being only of secondary importance in Echinoid morphology. The arguments produced for this quite new and rather startling conclusion are especially some remarkable cases of abnormal variations in the regular Echini; also the absence of genital 5 in Spatangoids is regarded as leading towards this conclusion.

There may, however, be raised some objections to this. I would first say that it seems to me rather unsafe to base so im-

portant a conclusion on cases of aberrant variation, which are, in spite of the ingenious way in which Jackson treats them, only abnormalities. Further the absence of genital 5 in Spatangoids is perhaps not quite a sure fact. I have shown[1]) that in *Abatus cavernosus* the genital 5 really exists in the young stages, and perhaps it may not be too hardy to conclude that it will also prove to exist in other Spatangoids. On the other hand I would point out that the fact, that in some Pourtalesiids the posterior ocular plates are as rudimentary as the posterior genital plate of Spatangoids, might with equal right be regarded as leading to the inverse conclusion: that the ocular plates have nothing to do with the development of the ambulacral plates. There is, however, another and more important fact which is decidedly not in favour of Jackson's interpretation.

It is emphasized by Prof. Jackson as one of the main results of his researches that *Bothriocidaris* is the most primitive of all known Echinoids, from which all the rest must be derived and I quite agree with this. But how to apply Jackson's interpretation of the interambulacra to the single series of interambulacral plates in *Bothriocidaris*? Can the single series of plates belong to both the neighbouring ambulacra? It seems evident enough that here the interambulacra have no such relation to the oculars even if they be in contact with two oculars, and since we cannot, of course, suppose, that the interambulacra of *Bothriocidaris* have another value than those of other Echini, the interpretation of Jackson seems to me to lack real foundation. It is curious, indeed, that Professor Jackson does not appear to have thought of this point, obvious though it be. — A form like *Meekechinus*, with three series of interambulacral plates, likewise affords difficulties for the interpretation of Jackson, as also some forms of the genus *Lepidesthes* are not easily brought in accordance with his view; I might recall e. g. Pl. 68. fig. 5 (of *Lepidesthes formosa* Müller).

---

[1]) The Echinoidea of the Swedish South Polar-Expedition p. 76—77.

But *Bothriocidaris* is by far the most important in this connection and seems to me definitely to dispose of Jackson's interpretation of the interambulacra. The genital plates are thus not thereby deprived of any part of their morphological importance, and the other arguments adduced by Jackson for regarding these plates as being only of secondary morphological value do not appear to me to give better support for this opinion. These arguments are: that the madreporic pores may sometimes extend beyond genital 2, to which plate they are typically limited, and that the genital pores are sometimes placed outside the genital plates. It must be emphasized that the primary madreporic pore is, so far as known, always connected with genital 2. How the fact that the pores may sometimes in later stages extend also to some neighbouring plates, while still occupying the genital 2, can alter anything in the primary relation between the madreporite and the genital 2, I am, indeed, unable to see. Likewise I do not see that the fact of the genital pores being sometimes placed outside the genital plates, as in the Clypeastroid *Peronella peronii*, can be of so eminent importance. But the relation of the genital pores and the genital plates is, upon the whole, scarcely of so primary importance. Without entering upon the question of the general homology of the genital plates of the Echini, I would decidedly maintain, against Jackson, that these plates are really of primary importance for the morphology of the Echinoids.

The apical system of Echinoids has been made the object of very extensive studies, and the report on these researches makes one of the most extraordinary chapters in Jackson's work. More than 50,000 specimens of recent and Mesozoic Echini have been carefully examined and tabulated as regards the arrangement of the apical plates, and the results of the study of all the variants are very remarkable. It is shown that the generally expressed view that more oculars are insert in large specimens than in the young is without foundation. "All the evidence goes to show that the full number of oculars that are to become insert are developed

early in the life of the individual, and apparently later no change in this respect takes place" (p. 91). Among the numerous types carefully studied in this regard *Strongylocentrotus drøbachiensis* stands foremost with no less than 33,000 specimens in all sizes examined; the report on this study enforces deep admiration, and with full right Jackson states that it opens up a line of inquiry which would be worth following further in these and other Echini. The demonstration of the different localities having their own characteristic variations — e. g. the more primitive forms being bound to localities which receive a considerable increment of fresh water, while the more advanced forms are peculiar to the localities with oceanic conditions — is the beginning discovery of the conditions which cause variations to occur in these forms.

The results obtained as to the order in which the different ocular plates become insert are very remarkable. In 98,55 % of "Centrechinoidea" the order was found to be I, V, or V, I; IV, II, III, viz. the bivial plates always being the first to be inserted, the unpaired ocular (III) of the trivium the last — a very striking argument in favour of Lovén's orientation. Further "the order of sequence in which the bivium comes in emphasizes family characters." The order I, V is characteristic of the Hemicidaridæ, Diadematidæ, Saleniidæ, Stomopneustidæ, Temnopleuridæ, Echinidæ and "Strongylocentrotidæ"; the order V, I is characteristic of the Arbaciidæ and the Echinometridæ. On the other hand Jackson seems to me to go a little too far in stating that, because the genital plate 3 has been found divided by a transverse suture in 275 instances, "this seems to be a family peculiarity, as it was observed in several species of the Echinidæ as in *Tripneustes esculentus* and in the Strongylocentrotidæ" (p. 168). — I may here add the remark that the statement of Jackson (e. g. p. 88) that *Salenia Pattersoni* has no externally visible genital pores, is incorrect — of course. How should the animal get rid of its genital products, if there were no external genital pores? The pores are there, but are partly hidden among the prominences of the plates.

It may not be superfluous to state that I have found the genital pores perfectly distinct in a specimen of 12 mm diameter, the same size as the specimen of which Jackson has figured the apical system, and in which he did not find the genital pores (Pl. 4, 2).

In regard to the anal plates I am glad to see that Prof. Jackson joins me in the view maintained by me (Echinological Notes III. Jan. 1911) of the conspicuous suranal plate of Saleniids and young Echinids, that it is a specialized, not a primitive feature, this plate having accordingly by no means the great morphological value, which has been ascribed to it by Lovén a. o. Professor Jackson lays some stress on the fact, that in *Salenia* and *Salenocidaris* the suranal plate lies "dorsal to genital 3, while in *Peltastes* and some *Acrosalenias* it lies "dorsal to ocular III." I would suggest that the position of the suranal plate is in reality the same in both cases: what makes the difference is the position of the periproct and the anal opening. In the former case it is eccentric in the direction of Ocular I, as is the common condition in the Echinina; in the latter case it is eccentric in the direction of genital 5, viz. in the same direction in which the anal opening moves backwards in the Exocyclica.

I may note in the briefest way such interesting points as the representation of the different ways adopted for increasing the number of tube-feet (— Jackson might there well have gone a little farther and mentioned that after the condition of the compound ambulacral plates has been reached, the increase of the number of tubefeet still continues and along two different ways viz. either by the narrowing of the compound oligopore[1]) (triseriate) plates accom-

---

[1]) A. Tornquist in a recently published, very interesting paper: „Die biologische Deutung der Umgestaltung der Echiniden im Paläzoikum und Mesozoikum (Zeitschr. f. induktive Abstammungs- u. Vererbungslehre VI. 1911) uses the term „oligopor" in quite a new meaning, designating that the two pores of a pair in a primary ambulacral plate are placed obliquely to one another. I would decidedly protest against using the old familiar word in this new meaning. It may be convenient to have a word for designating that position of the pores: but "oligopore" means in Echinology a compound plate consisting of three primary plates and should be kept in this sense.

panied by the elimination of the primary tubercle on alternate plates, as is carried to an extreme in such forms as *Tripneustes* and *Holopneustes*, or by the adoption of a polyporous condition; cf. Ingolf-Echinoidea I. p. 132—133) — the demonstration of the fact that in the tuberculation the main point is not the number of tubercles on an interambulacral plate but the distance between the tubercles, — and pass to another most important part of the work, viz. that dealing with the masticatory organs.

The manner in which Jackson treats these rather intricate anatomical structures is so clear and lucid as to deserve sincere admiration[1]). Though these structures have been the object of study several times, and even by so eminent an investigator as Lovén, Jackson has succeded in finding a character (— pits in the dorsal side of the half-pyramids, below the epiphyses —) which, together with such other features as the structure of the teeth and the shape of the foramen magnum, is of primary value for classification. On the basis of these characters he establishes the three suborders of the "Centrechinoidea": *Aulodonta*, *Stirodonta* and *Camarodonta*, being thus characterized: The *Aulodonta* have grooved teeth and narrow epiphyses, not meeting in suture over

---

[1]) When speaking of the inner projections from the ambulacral plates in *Hyattechinus* and the Cidarids (p. 61) Jackson states that A. Agassiz has described such "spines extending into the body from the inner face of the peristomal ambulacral plates of *Porocidaris Cobosi*, but I believe they have not been noticed before in coronal ambulacral plates". I may mention that Wyv. Thomson ("Porcupine" Echinoidea 1872. p. 728) gave a description and very good figure of these structures in *Porocidaris purpurata*, as pointed out by Agassiz in the place quoted by Jackson. Further Ch. Stewart in his paper "On certain Organs of the Cidaridæ" (Trans. Linn. Soc. 2. Ser. Zool. I. 1877), quoted by Jackson himself, gives a pair of excellent figures (Pl. 70, 6—7) of these ambulacral processes in *Cidaris tribuloides* and *Phyllacanthus baculosa*, and in his description thereof (p. 571) he refers to the descriptions and figures of such "vertebral processes" given already by Joh. Müller. For the sake of completeness I may remark that in the Ingolf-Echinoidea (I) I have mentioned the existence of such ambulacral processes in *Cidaris affinis*, *Stereocidaris ingolfiana* and *Dorocidaris papillata*, giving figures of those in the two latter (p. 40, Pl. VI. 5—6). It is thus not a quite new fact which Jackson has here produced.

the foramen magnum, the *Stirodonta* have keeled teeth and narrow epiphyses, not meeting in suture over the foramen magnum, and the *Camarodonta* have keeled teeth and wide epiphyses, meeting in suture over the foramen magnum (p. 183). The *Aulodonta* include the families Hemicidaridæ, Aspidodiadematidæ, Diadematidæ and Echinothuridæ; the *Stirodonta* include the families Saleniidæ, Phymosomatidæ, Stomopneustidæ and Arbaciidæ; the *Camarodonta* include the families Temnopleuridæ, Echinidæ, "Strongylocentrotidæ" and Echinometridæ.

With this classification (— excepting the position of the Echinothuridæ and, perhaps, the Stomopneustidæ —) I agree, of course — it is, in fact, very nearly the same classification which I have set forth in my "Siam-Echinoidea" (p. 55—56), the difference being only (besides the Echinothuridæ) that I placed the Stomopneustidæ among the Camarodonta (my Tribus 4), while Jackson includes that family in the Stirodonta which contain both my tribus 2 (the Salenina) and tribus 3 (the Phymosomina). (Regarding the Salenina I stated (p. 55) that "it is perhaps not unreasonable to see their nearest allies in the *Arbaciidæ*"). One of the main characters of my classification was the structure of the teeth: keeled or unkeeled, a feature which had not hitherto been taken into consideration. It is Jackson's merit to have noticed the other important features of the masticatory apparatus, of which especially the "foramen magnum" appears to have an important bearing on the grouping of the Diadematoidea. Jackson does not fail to notice that I was the first to draw attention to the classificatory value of the structure of the teeth — he might also have noticed that the classification of the Diadematoidea to which his researches have led him is practically the same as that set forth by me (with the exceptions pointed out above). The fact that both of us have thus reached practically the same conclusions as to the mutual interrelations of all these forms is a sign that we are now well on the way to having their classification settled in accordance with their true natural relationship.

One of the main characters upon which my classification was founded, is the structure of the ambulacra, whether simple or compound, and in the latter case, whether of the diadematoid or the echinoid type (viz. in the former the second of the primary plates, in the latter the first of the composing primary plates being the largest). I think Jackson is right in not regarding the distinction between those with simple and those with compound plates as of essential importance, from which it follows that the Saleniidæ must be united with the Arbaciidæ etc. The difference between the two types of compound ambulacra, on the other hand, I would not be inclined to drop as a character of primary importance. Jackson does not mention this feature at all and appears to have paid no attention to it, no reason being given for thus disregarding a structural feature to which other workers (Duncan and myself) have ascribed a considerable systematic value. This accounts for the different place given to the Stomopneustidæ. According to the structure of the ambulacra it belongs to the Camarodonta, according to the character of the "foramen magnum" it belongs to the Stirodonta. Here is a contradiction between two important characters; for the present it is impossible to settle the question. The only certain thing is that *Stomopneustes* represents a very peculiar type, not very closely allied to any of the other Diadematoids.

While the classificatory results of Jackson's researches on the Diadematoids are thus mainly a confirmation of my views on their mutual interrelations, the names *Aulodonta, Stirodonta* and *Camarodonta* are as new as they are excellent. They could scarcely be better and will certainly be generally adopted. — I am sorry that I cannot express the same satisfaction with the main result of the whole work: the classification of the Echinoidea and the views on their phylogeny as expressed therein.

It has been rather universally adopted in recent times that the Palæozoic Echinoids should not be regarded as a separate group, in opposition to all the rest of the Echinoidea. Though Jackson does not directly maintain the old arrangement, his

classification represents a decided step away from the recent towards the old view. His order *Perioschoechinoida*, which comprises all the pluriseriate forms (excepting the Echinocystoida, the Plesiocidaroida and the Cretaceous *Tetracidaris*) is placed apart from all the biseriate forms and represented as having no nearer relation to any recent group. *Bothriocidaris* is regarded as the most primitive form, which has given rise to four separate orders: the Echinocystoida, the Perischoechinoida, the Plesiocidaroida and the Cidaroida; from the latter the order Diadematoida ("Centrechinoida") is derived, and from one of the suborders of this order, the Stirodonta, is derived the order Exocyclica.

Against the primitive character of *Bothriocidaris* I think there can be raised no objection. Not only is it the oldest Echinoid known, but it also decidedly represents the simplest type of Echinoid structure known; especially the single column of interambulacral plates must be regarded as a very primitive feature, recapitulated in the ontogeny of all other Echini, the interambulacra always beginning with a single primordial plate — the "Protechinus"-stage, as designated by Jackson[1]). That *Bothriocidaris* represents the ancestral type, from which all the rest of the Echini have developed, seems then beyond doubt. Likewise it can scarcely be questionable that the Echinocystoida — judging from the imperfect knowledge we possess of them and on the premiss that their exocyclic character is a reality[2]), — represent a special branch, which has not given rise to the development of other types. But here my accordance with Jackson in the views of Echinoid phylogeny stops.

Jackson's main argument for regarding the Perioschoechinoida as a group which has no descendants among the rest of the Echinoids is this, that the pluriseriate arrangement of the coronal

---

1) R. T. Jackson. Studies of Palæechinoidea. Bull. Geol. Soc. America. Vol. 7. 1896. p. 235. In the "Phylogeny" he only uses this name occasionally (p. 210).

2) I am not very much inclined to think it is correct.

plates is a highly specialized feature; accordingly the more primitive biseriate arrangement cannot have been derived therefrom, and there is, in fact, no evidence, palæontological or embryological for such a derivation. After the primordial single series of (interambulacral) plates necessarily first follows a biserial arrangement and then gradually the pluseriate arrangement develops therefrom; this order of events is actually found in the ontogeny of the Perischoechinoids, as Jackson has shown beyond doubt. However, I do not think it proved definitely herewith that the biserial arrangement is a more primitive type than the pluseriate arrangement. I am here thinking only of the interambulacra; in the ambulacra, where a monoserial arrangement is unknown and certainly never existed, the biserial type, of course, is the primitive, the pluseriate type the more specialized arrangement. I then quite agree with Jackson that the Perischoechinids with pluriseriate ambulacra, viz. the Palæchinidæ and the Lepidesthidæ, represent types which have left no descendants beyond the Palæozoic times. With the Archæocidaridæ and Lepidocentridæ, which have both biserial ambulacra, the matter lies quite differently.

I would first point out the peculiar fact that, while in those families with pluriseriate ambulacra the primitive forms with biseriate ambulacra, from which the development has necessarily started, are well known (*Palæechinus*, *Lepidechinus*), there is not known a single palæozoic Echinoid with two series of interambulacral plates (excepting *Miocidaris cannoni* Jackson and *keyserlingi* (Geinitz) which cannot come into consideration here, being from the Lower Carboniferous and Permian). According to Jackson's view such forms must have existed before the forms with pluseriate interambulacra and have given rise to the latter. How remarkable that no trace at all appears to have been left of these forms! The reason of this is, in my opinion, not to be sought for in the imperfectness of the geological record but in the non-existence of such forms. It is true that after the primordial interambulacral plate in the Perischoechinoids follow first two, then three plates

and so on; but the reason, why there are only two plates next to the single primary plate, needs by no means be this, that it is a recapitulation of a phylogenetic stage with biseriate interambulacra (— according to the "law of localized stages in ontogeny," which Jackson lays rather much stress on —) it may simply be due to the fact that there is no room for more plates here. Jackson's suggestion that the pluseriate interambulacrum represents a more specialized type than the biseriate finds, in fact, no support in the forms actually known, and neither are there morphological reasons, which make that suggestion necessary. On the contrary it is more in accordance with general morphology to regard the many plates, more or less regularly arranged, (— the serial arrangement is perhaps not always so distinct as would appear from the connecting lines which Jackson adds in his analytical figures; in the Echinocystoida the arrangement is apparently not at all serial —) as the primitive condition from which the biserial arrangement developed. In the family Lepidesthidæ a similar development is actually seen; in the most specialized of them all, *Meekechinus elegans*, in which the ambulacra consist of no less than twenty columns, the interambulacra are only triseriate. A parallel development may be seen in the Cystidea, and even in Vertebrates a parallel can be pointed out, viz. in the morphology of the paired limbs. — On the other hand, a pluseriate arrangement may well be the result of a special development from the biserial type. *Tetracidaris* is an example thereof. (From Vertebrate morphology a somewhat similar case is known in the many-jointed fingers of Cetaceans).

In a letter to me Jackson points out that there is no embryological evidence for the pluseriate condition being the more primitive; it might be suggested that, if it be really so, one might expect to find traces of a pluseriate condition in the young developing Echinoid. I agree that such a most interesting stage, whereby the question would be definitely settled, has not been found. But it may also be remembered that scarcely any Echinoid as yet has

been carefully studied as regards the first formation of the coronal plates. It is thus by no means impossible that traces of a pluriseriate condition may yet be found in the development stages of recent Echini; especially it would be interesting to investigate the Echinothurids in regard to this question. Perhaps also *Pygmæocidaris* might be regarded as a case of atavism, recapitulating the ancestral pluriseriate condition. — But even if no embryological evidence for the primitive character of the pluriseriate condition can be found, I think the reasons given above for that opinion outweigh completely Jackson's reason for regarding the pluriseriate condition as the most specialized, viz. that a pair of biseriate plates are actually seen below the pluriseriate. There is no proof that this really represents a phylogenetic stage; as stated above it is sufficiently explained by the conditions of space.

Accordingly the pluriseriate interambulacra of the Perischoechinoids, in my opinion, represent a primitive condition, not a very specialized, and there is herein no reason, why the Archæocidaridæ should not have given rise to the Cidaridæ and the Lepidocentridæ to the Echinothuridæ and the Diadematoidea. The Archæocidaridæ so closely resemble the Cidarids in all their characters that, in fact, the pluriseriate interambulacra make the only essential difference. The only natural thing is then to regard the Archæocidarids as the direct ancestors of the Cidarids. Jackson's discovery of a true Cidarid, *Miocidaris cannoni*, from the Lower Carboniferous, is, of course, in no way in contradiction with this view. I am glad to agree herein completely with Bather, who states (Triassic Echinoderms of Bakony, p. 251) that "there is no reason to doubt that *Archæocidaris* is a true ancestor of *Miocidaris*." Tornquist (Op. cit. p. 32) likewise states „dass sie (die Archæocidariden) mit Sicherheit als ihre (der Cidariden) direkten Vorläufer angesehen werden können."

In the "Siam-Echinoidea" I (p. 53) I suggested that the Echinothurids have developed from the Lepidocentridæ, in which the ambulacral plates cover the peristome in the same way as in

the former. Against this suggestion Jackson raises the objection (— besides the multiseriate condition of the interambulacra —) that in the Lepidocentridæ there have been no external gills while such occur, as well known, in the Echinothurids. It is possible that Jackson is right in this assertion, but this cannot be proved definitely. The gill notches do not precede the external branchiæ in the ontogeny of recent Echinoids, the branchiæ appear before the notches, and, as Bather states ("Triassic Echinoderms of Bakony", p. 251), the same course was probably followed in phylogeny. "We cannot therefore expect any definite palaeontological evidence as to the origin of the external branchiæ." "In many early species, which all writers agree to refer to the Diademoida, these notches are very feebly developed, and it is quite obvious that the branchiæ may have existed without the notches." Such cases are actually found among the Echinothurids (I would refer to such figures as Pl. 70.2, *Aræosoma thetidis* (H. L. Clark), Pl. 77.1, *Aræosoma leptaleum* A. Ag. & Cl., Pl. 82.5, *Aræosoma gracile* (A. Ag.), in A. Agassiz & H. L. Clark's Memoir on the Echinothuridæ [1]), and upon the whole the gill notches are very indistinct and irregular in this family. If Jackson had found such forms as those referred to above in a fossil state, he would probably have concluded that no external gills were present. I would by no means find it improbable that external gills did really occur in some Lepidocentridæ; thus in *Hyattechinus pentagonus* it is seen from the analysis of the test given by Jackson (Pl. 25.1) that a naked space occurred at the adoral side of the primordial interambulacral plate. One might well suggest that small external gills were present here.

But even if Jackson is right that external gills did not exist in the Lepidocentrids, but only "Stewarts organs" [2]), I do not

---

[1]) Hawaiian and other Pacific Echini. The Echinothuridae. Mem. Mus. Comp. Zool. XXXIV. 1909.

[2]) The suggestion that these organs have the function of "internal branchiæ" appears physiologically impossible. How could an organ

see therein a difficulty for the derivation of the Echinothurids from the Lepidocentrids. Somewhere in the course of phylogenetic development the external branchiæ must have come into existence, and their rather rudimentary condition in the Echinothurids is decidedly in favour of the suggestion that they have arisen here or in their direct ancestors. — And then there is another fact which is at least an important argument for regarding the Echinothurids as the group of the Diadematoidea nearest related to the Palæozoic forms, even if it cannot perhaps directly prove the genetic connection between the Echinothurids and the Lepidocentrids, viz. the existence in the formér of well developed Stewarts organs. To place the Echinothurids at the top of the Aulodonta, as does Jackson, is certainly not in accordance with this important anatomical feature, the other Diadematoids having no Stewarts organs. (Only in *Echinothrix* quite rudimentary Stewarts organs are found, according to A. Agassiz & H. L. Clark. Op. cit. p. 142. Pl. 60.4). Also the existence of many ambulacral plates on the peristome is, in my opinion, doubtless a primitive character. The suggestion of Döderlein (Echinoidea d. deutsch. Tiefsee-Exp. p. 82) that this may perhaps be a newly acquired character, seems to me without any real support. (It is only fair to state that Döderlein does not maintain this as his own opinion, only as a possibility).

I think it has been shown herewith that the existence of gills in the Echinothurids is an even less valid argument than the multicolumnar interambulacra of Lepidocentrids, against the genetic connection between these two families. In the masticatory apparatus Jackson has shown some differences to exist, viz. the upper surfaces of the half pyramids being pitted in Echinothurids (as in all Diadematoids), while they are smooth in the palæozoic forms; styloid processes are distinct in the Echinothurids, not found in Lepido-

which has no contact whatever with the external surroundings act as a respiratory organ? As set forth most excellently by Bather (Op. cit. p. 252) the function of the Stewarts organs is to act as reservoirs of the fluid within the peripharyngeal sinus by changes of pressure due to the contraction of certain muscles.

centrids, judging from *Pholidechinus brauni*, of which an excellently preserved lantern is figured by Jackson (Pl. 27). Otherwise the lantern of Echinothurids is of a primitive type, recalling that of the palæozoic forms. A perignathic girdle does not appear to have existed at all in the palæozoic Echinoids; in the Echinothurids it is well developed, though in certain regards peculiar. Is there in these facts sufficient reason for separating the Echinothurids sharply from the Lepidocentrids? I cannot agree to that. The perignathic girdle must have originated once, and the same thing holds good for the styloid processes and the pits in the pyramids. Against all the other important facts speaking in favour of a genetic relation between these two families, these pits and styloid processes appear to me quite trivial and of very slight importance. Likewise the fact that the ambulacral plates are compound in the Echinothurids, simple in the Lepidocentrids cannot, of course, be taken as an argument against the derivation of the former from the latter, — it is, indeed, only what should be expected.

There is only one real difficulty for the derivation of the Echinothurids from the Lepidocentrids, viz. the fact that the Echinothurids are not known below the Jurassic, while the Lepidocentrids are not known beyond the Lower Carboniferous. From the Carboniferous proper, the Permian and Trias no connecting form is known, and, as Jackson justly emphasizes in a letter to me, this is a large geological gap. It is, of course, not very satisfactory to have recourse to the imperfectness of the geological record (— as stated above, Jackson must do so himself to explain the conspicuous absence of biseriate forms older than the pluriseriate, which according to his opinion must have existed —). Still it cannot be avoided. I would point to the fact that upon the whole the Echinothurids are exceedingly rare fossils even in those periods where they are known to have existed. Further I would recall the fact that the oldest known Echinothurid, *Pelanechinus corallinus* Groom, is in some way the most specialized of all Echinothurids, as it has polyporous ambulacra. It is certainly

impossible that such a form should not have had a long series of ancestors, whether it be derived from the Lepidocentrids, as I think, or from the Cidarids (directly or indirectly), as would probably be maintained by Jackson. But in any case no connecting forms are known. The geological record is imperfect, also as regards such forms as the Echinoids, and the fact that connecting forms are not known from the named periods can by no means outweigh the morphological arguments for the genetic relation between the two groups.

In spite of the reasons Jackson has produced against the relationship between Echinothurids and Lepidocentrids I thus feel more convinced than ever that the Lepidocentrids are the direct ancestors of the Echinothurids. Whether it is then preferable to unite these two families into one group, the Streptosomata, or to unite the Echinothurids with the Diadematoids into one group, the Aulodonta, is a matter of minor importance; it depends on which features are regarded as the most important. I, for my part, think that the character of the ambulacral plates covering the peristome is more important than the differences in the interambulacra and the masticatory apparatus, and therefore prefer to unite the Lepidocentrids and the Echinothurids into one group, the Streptosomata, this classification having also the advantage of emphasizing the genetic relation between the palæozoic and the recent forms. On the other hand I am equally convinced that the Echinothurids are closely related to the Diadematids and probably gave rise to the latter, being thus in full accordance with Döderlein (Op. cit.) and A. Agassiz & H. L. Clark (The Echinothuridæ p. 141) who maintain the close relationship between these two groups as the result of their investigations.

Jackson's view that the Diadematoids have developed from the Cidaroids, however, gets important support from another side, viz. from Bather and Tornquist. Bather (Triassic Echinoderms of Bakony; p. 254) arrives at the conclusion that the Diademoida "and the remaining Ectobranchiata" were derived from the

Cidaroida, "however improbable it may at first have appeared", founding on the fact that the Triassic Diademoids *(Mesodiadema, Diademopsis)* represent transitional forms between these two groups, it being, in fact, almost impossible to decide (from the material available) whether they are really Cidarids or Diadematids. The "less violent hypothesis" that the Ectobranchiata might derive from the Lepidocentridæ, in which, as in the Diademoids, the interambulacra are absent from the peristome, both differing in this important point from the Cidarids, is rejected on the following ground. In the Lepidocentridæ the primordial interambulacral plate is retained in the adult, "whereas the Diademoida are clearly derived from forms in which the adoral interambulacrals have disappeared", the absence of interambulacral plates from the peristome in these two groups being thus apparently due to different causes. "A considerable series of genera would therefore be required to bridge the gap between the Lepidocentridæ and the Diademoida, but of this postulated series no representatives are known. This hypothesis therefore would present more rather than fewer difficulties."

Tornquist[1]), independently of Bather, has arrived at the same conclusion, that the Diadematoids have been derived from the Cidarids. He founds this conclusion on the fact that the primitive Diadematoids ("Prodiadematidæ") have simple ambulacral plates like those of the Cidarids, the most primitive type being that with the porepairs horizontally arranged, the next stage having them obliquely placed ("oligopore", as he erroneously designates it; see above p. 218). In the last paper quoted he emphasizes his agreement with Bather in regard to the phylogeny of these groups, stating that „ein Zweifel darüber, dass die gesamte Gruppe der *Diadematoidea* und damit auch indirect die *Irregulares* von den Cidariden abzuleiten ist, kann auch nach dem Urteil Bather's nicht mehr bestehen"

---

[1]) A. Tornquist. Die Diadematoiden des württembergischen Lias. Zeitschr. d. deutschen geol. Ges. 60. 1908. p. 378. Die biologische Bedeutung der Umgestaltung der Echiniden im Palæozoikum und Mesozoikum. Zeitschr. f. indukt. Abstamm.- u. Vererbungslehre VI. 1911.

(p. 46). He even maintains that the Cidarids have given rise to Diadematoids independently at different times, the recent *Aspidodiadema* being regarded as a „neu erfolgte Abwandlung von Cidariden" (p. 46).

Tornquist's argument for deriving the Diadematoids from the Cidarids, viz. the simple ambulacra, is evidently quite insufficient as basis for such a conclusion. I need only recall the fact that also the Lepidocentrids have simple ambulacra. Further, as regards the position of the pores, upon which Tornquist lays so much stress, it is anything but certain that the horizontal arrangement is the more primitive. In the young Cidarids the pores stand very obliquely, assuming in the course of development gradually a more horizontal position, as first shown by Döderlein (Die Japanischen Seeigel. I. Cidaridae u. Saleniidae 1887. p. 30). The vertical position of the pores is also shown very clearly in the beautiful figures of a young *"Goniocidaris" (Austrocidaris) canaliculata* given by Lovén in his "Echinologica" Pl. II; in my "Siam-Echinoidea" I. p. 8 I have mentioned the same feature for the young *"Stephanocidaris" (Plococidaris) bispinosa.* Of no less importance is the fact that also in *Bothriocidaris* the pores are vertically placed. Jackson (p. 57) has no doubt that the superposed position of the pores is the primitive, and I must fully join him in this view, both the embryological and palæontological evidences being decidedly in favour of it. — Finally as regards Tornquist's suggestion that *Aspidodiadema* represents a separate, recent offshoot from the Cidarids, this is evidently the result of disregarding all other characters than those afforded by the coronal plates. I see, however, no reason to enter more particularly upon this question here.

Bather's reason for rejecting the derivation of the Diadematoids from the Lepidocentrids, that the primary interambulacral plate has disappeared in the former, does not seem to me better than that adduced by Tornquist. It appears that Dr. Bather has not taken the Echinothurids into consideration. Here we see

the primordial interambulacral plate retained as in the Lepidocentrids, only more or less reduced in larger specimens. Also in the Diadematids the primordial interambulacral plate is certainly present in young specimens — as it is upon the whole in all young Echinoids — the only difference being that in the Diadematoids it is resorbed at an early point of the development, in the Echinothurids only partially, while in the Lepidocentrids it was retained in its original shape during life. There is here a gradation agreeing, indeed, most beautifully with what must be required on the assumption of a direct genetic connection between these three families, and there is not required a series of unknown forms to bridge over the gap; in fact, there can scarcely be said to be a gap in the series Lepidocentridæ—Echinothuridæ—Diadematoidea. As for Bather's other argument, that it is impossible to decide whether such forms as the Triassic *Mesodiadema* and *Diademopsis* are really Cidarids or Diadematoids, because they are intermediate between these two groups, I would venture to think that the difficulty is due to the imperfect knowledge of these forms; as Bather himself says: "were the complete test, and still more the living animal, preserved to us, the difficulty might not occur" (Op. cit. p. 254). To base so "violent" a hypothesis on some few fragments of tests and some doubtful radioles against all other evidences afforded by both recent and, much better known, fossil forms, I really find unjustifiable.

While thus I cannot agree with Jackson, Tornquist and Bather in assuming that the Diadematoids were derived from the Cidaroids, I am inclined to think on the other hand, that the Saleniids, and then probably all the Stirodonta, are derived from the Cidaroids, not from the Diadematids. A main argument for this is the structure of the spines in the Saleniids, viz. the presence of an outer layer, ostracum, corresponding to what occurs in Cidarids. It does not appear very probable that this structure has developed from Diadematid spines. The Arbaciids present traces of the same outer layer and thus appear to represent a further stage of

development; in the rest of the Stirodonta this outer layer has quite disappeared.

The Exocyclica Jackson derives as a whole from the Stirodonta, more especially the Arbaciids, however without going more into detail in regard to this interesting part of the phylogeny of the Echini. Against this derivation some objections may be raised. It is undeniable that in some diadematoid forms (*Pygaster*) we may trace the transition from the Diadematoid type to the primitive exocyclic type, the Holectypoidea; in fact it is difficult or almost impossible to draw a distinct limit between the Holectypoidea and the Diadematoidea. This fact is decidedly in favour of the suggestion that we have here really the ancestors of at least a part of the Exocyclica. Further it is an important fact that in the Holectypoids, as also in the Spatangoids the tubercles are perforate[1]), which is doubtless a primitive feature. But in the Stirodonta the tubercles are imperforate. In deriving the Exocyclica from the Stirodonta we would then have to assume the primitive perforate tubercles to have developed from the more specialized imperforate tubercles of the latter, which is certainly not very probable.

However, I think it quite probable that also the Stirodonta have given rise to some Exocyclica. As I have set forth in my "Echinological Notes" III.[2]) there are reasons for the suggestion that the Cassiduloids have developed from the Salenids. The tubercles are imperforate, the teeth are keeled and there is a distinct suranal plate; these important facts are certainly in favour of the Salenid origin of this group. The Exocyclica thus probably had a diphyletic origin[3]).

---

1) Jackson states (p. 78) that the primary tubercles are imperforate in the Holectypina and "many of the Spatangina". This is incorrect. Among the Exocyclica imperforate primary tubercles occur only in the Cassiduloidea.

2) The central (sur-anal) plate of the Echinoidea. Vid. Medd. Naturh. Foren. København 1911.

3) Tornquist, who likewise has come to the conclusion that the Cassidulids (he names only *Galeropygus* and *Pyrina*) have arisen sepa-

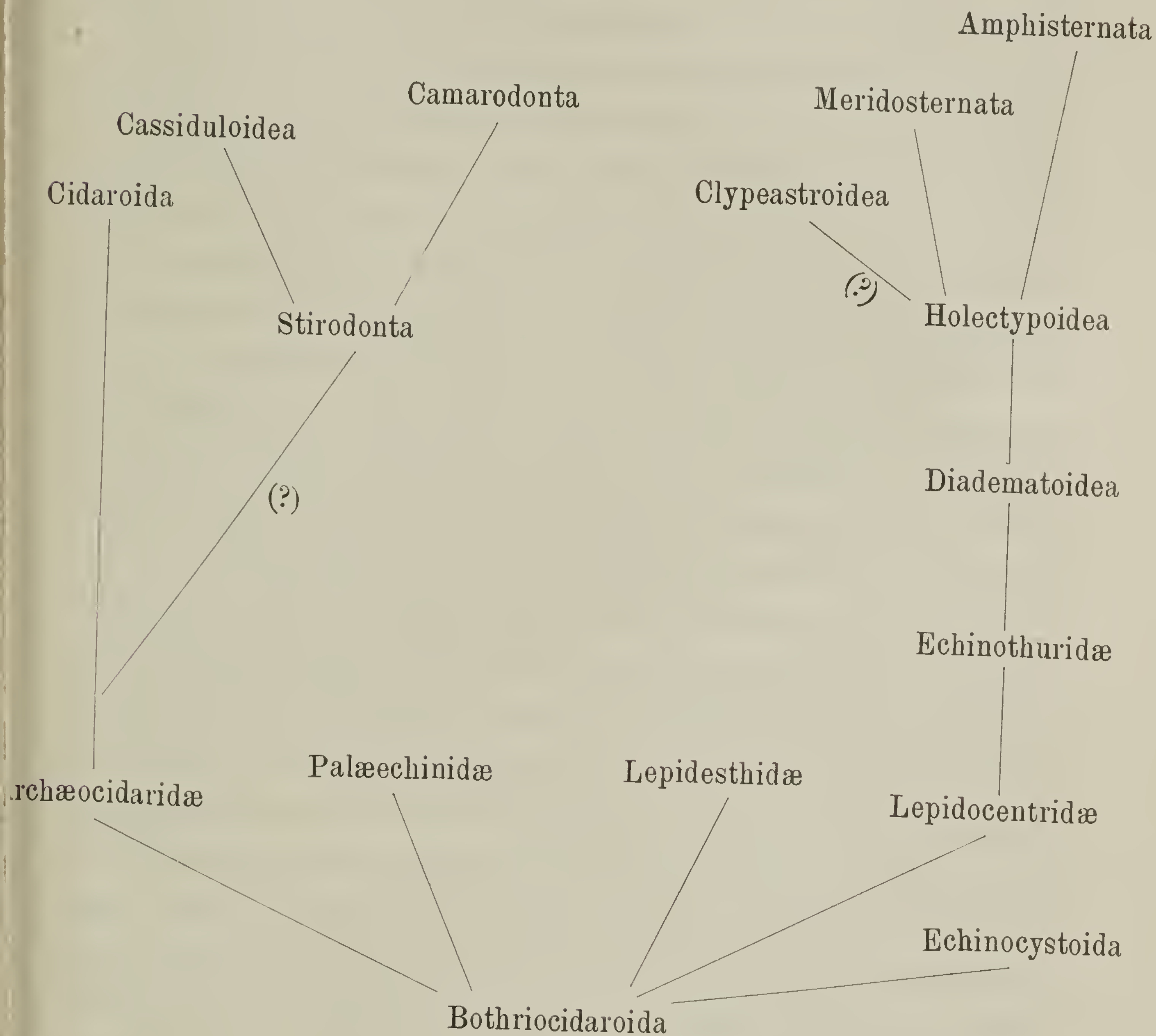
There still remain the Plesiocidaroida, which Jackson also regards as a separate branch which "with present knowledge is not closely affiliate with any other group" (p. 220). Jackson thus does not accept the highly interesting suggestion af Döderlein (Echinoidea d. deutsch. Tiefsee-Exp. p. 183—184) of its relations to the Arbaciids, based mainly on his discovery that an unpaired median interambulacral plate also exists in the recent *Pygmæocidaris prionigera.* He suggests (p. 215, note) that "it is possible that Döderlein was misled in introducing the sutures of this plate, a point difficult to ascertain in such a small specimen (4,8 mm) as he had." I do not see what right Jackson has to doubt the correctness of Döderlein's definite statement, which gives so natural an explanation of the otherwise rather enigmatical *Tiarechinus.* It is true that Bather (Op. cit. p. 257—259) has given another explanation of this median plate and comes to the result that there is no nearer relation between *Tiarechinus* and *Pygmæocidaris.* But I am by no means convinced that Bather is right and am still inclined to accept Döderlein's view. To enter in a more detailed way on this most interesting question is, however, not the place here. I would only emphasize that it can in any case by no means be regarded as definitely settled in the way in which Jackson puts it.

In concluding this discussion of the phylogeny of the Echini it may not be inappropriate to give the following graphic representation of my views on this highly interesting problem. I would,

---

rately from the regular Echini, states that „von allen Autoren wird die grosse Gruppe der jüngeren Echiniden mit excentrischen After, die sogenannten *Irregulares* allen übrigen Echiniden gegenüber als eine sehr formenreiche, aber einheitliche Echinidengesellschaft angesehen." ("Die biologische Deutung d. Umgestaltung d. Echiniden" p. 49). He has then overlooked my above quoted paper. I am not quite sure that I understand Tornquist's reasons for the separate derivation of *Galeropus* and *Pyrina*; but I shall not enter thereupon at this occasion. In any case it is interesting that the result of the diphyletic origin of the Irregular Echini has been arrived at independently by both of us.

however, point out that I do not feel sure of the point, from which the Clypeastroids should proceed. Likewise I quite realize that the derivation of the Stirodonta from the Cidaroida, independently of the Diadematoids, involves some difficulties. In a letter to me Jackson justly points out that on assuming the phylogenetic inter-



relations of the different groups as expressed in the above diagram quite a number of characteristic features must be accounted for as having developed independently in both groups. Jackson mentions as such: the two columns of plates in the interambulacra; only 10 primordial ambulacral plates on the peristone; the compound ambulacral plates; the peristomial gills, pits in the top of the

pyramids, keeled teeth, auricles and sphæridia. He might have added, that also the pedicellariæ then afford several cases of parallel development. Of these structures I do not see any difficulty in assuming the parallel development of the biseriate interambulacra and the compound ambulacral plates; indeed, I have in my previous works on Echinoids repeatedly emphasized that the compound ambulacral plates must have arisen independently in different groups. Likewise I see no difficulty in assuming that the ambulacral plates of the peristome have been reduced to a single pair in different groups. That the dental apparatus has developed in a similar way in the different groups does not appear to me so very improbable either; indeed, I think there is proof that keeled teeth have developed independently in different groups. As shown by Hawkins[1]) the teeth of *Discoidea cylindrica* were keeled, but *Discoidea* is undoubtedly derived from the Diadematoids with unkeeled teeth, in any case on a different line from the other Echinoids with keeled teeth. That the peristomial gills developed together with the dental apparatus, is very naturally explained from their physiological connection with this apparatus (cf. above p. 226, note). More difficult to explain is perhaps the parallel development of sphæridiæ and pedicellariæ. It would certainly be more satisfactory not to have to account for these features as parallelisms. But the structure of the spines seems to me to be best explained on the assumption of the genetic connection between the Stirodonta and the Cidaroids.

Before coming to the last part of Jackson's work I must say some words on the nomenclature. In general I think the names chosen are those which ought to be adopted. I am especially glad to see that Jackson retains the excellent name *Archæocidaris*, not adopting that quite misleading name *Echinocrinus*, which has, strictly taken, [the priority. But while here Jackson choses the only reasonable way, he unfortunately has acted in quite another way in regard to the still more important name

---

[1]) H. L. Hawkins. On the jaw apparatus of Discoidea cylindrica (Lamarck). Geol. Magaz. Now. Ser. Dec. 5 Vol 6. 1909. p. 148.

Diadema, which he rejects, establishing instead of it a new name *Centrechinus* (— and accordingly a new order-name, *Centrechinoida*, instead of the well-known *Diadematoida* —). His reason for doing this is that the name *Diadema* is preoccupied for a Cirripedian, while also a genus of butterflies and one of Gastropods have later on received the same name. He therefore thinks it better to drop this name altogether from Echinology.

This seems to me very injudicious. If the name *Diadema* stood alone in Echinology, there would be no very great harm done by this course. But what about all the names composed of ... *diadema*. There is *Eodiadema*, *Mesodiadema*, *Pseudodiadema*, *Hemidiadema*, *Hypodiadema*, *Diademopsis* etc. etc. — all names, which can under no condition be altered, but the name *Diadema* itself, known by any zoologist and palæontologist and used in all the echinological literature of the last century, must not be used, because the name was given in 1817 to a Cirripedian! — and for which it can even not be used, being a synonym only of the well known name *Coronula* Lmk. (from 1802)! Furthermore the name *Diadema* was in fact long before this time used for a sea-urchin, which belongs, in any case, to the family Diadematidæ, even if it is perhaps not the same as the genus now called *Diadema*, viz. by Schynvoet (Thesaurus imaginum Piscium testaceorum 1711)[1]. It is, of course, to be regretted that the name cannot be used for the butterflies and snails which have been thus designated; but they cannot possibly be taken into consideration here, having got that name after it was in use for the sea-urchins. In these cases, however, the difficulty can be quite simply avoided by merely changing the name a little, e. g. into *Diademia*, *Diodema*, *Diademella* or the like; by that way the continuity is easily kept. For the Echinoid name such change cannot be adopted, because of the numerous combinations with *-diadema*. Here is a case, where the name should be protected; to change the name *Diadema* is against

---

[1]) I have not seen this work myself.

all reason. The name *Centrechinus* ought to be a still-born name; I most sincerely hope that it will have that fate.

The large second part of the work, containing the systematic description of the Palæozoic Echini does not invite criticism. Indeed it appears, at least to one not himself trained in palæontological work, to be a masterpiece of work. Through Jackson's work the palæozoic Echini, so important both from a morphological and a phylogenetic point of view, have now become some of the best known fossils.

I would only point out that it would have been of no small importance if sections of the spines of the different types had been given, the structure of the spines being of considerable morphological value. Are the spines of Palæozoic Echinoids really so completely crystallized as to show not the slightest trace of their original structure? This would seem somewhat surprising in view of the fact that the spines of Triassic Echinoids have still retained very distinct traces of their original structure, as shown by the beautiful researches of Bather (Triassic Echinoderms of Bakony).

There is, however, one point, which strikes me as a peculiar mistake. Jackson states (p. 244) he has made the remarkable discovery that Aldrovandus in 1618 gave a figure "that is recognizable as belonging to Bothriocidaris," and he even thinks he can identify it as *Bothriocidaris globulus* Eichwald. "It is remarkable", he concludes "that this excessively rare echinoid should have been found so early and then lost sight of until recent years." This is a somewhat curious story. Jackson quotes the work of Aldrovandus as "De animalibus". 1618. Frankfort. There is no work of Aldrovandus of that little. There is one called "De animalibus insectis libri septem" and another called "De reliquis animalibus exsanguibus libri quattuor. De Mollibus, Crustaceis, Testaceis et Zoophytis." The edition of 1618 not being found in the Copenhagen libraries, I could only consult the editions of 1606 and of 1642. In both editions of "De reliquis animalibus

exsanguibus" I found the same figure named "Echinus lapis spoliatus a spinis," as quoted by Jackson. But this figure (represented in Fig. 1) is only an extremely bad representation of a fossil Echinoid, of which it can only be said with certainty that it is not *Bothriocidaris*, as it has doubtless two series of plates both in the ambulacra und interambulacra. On my communicating this fact to Prof. Jackson he sent me a photograph of the figure from the edition of 1618 (Fig. 2). It must certainly be

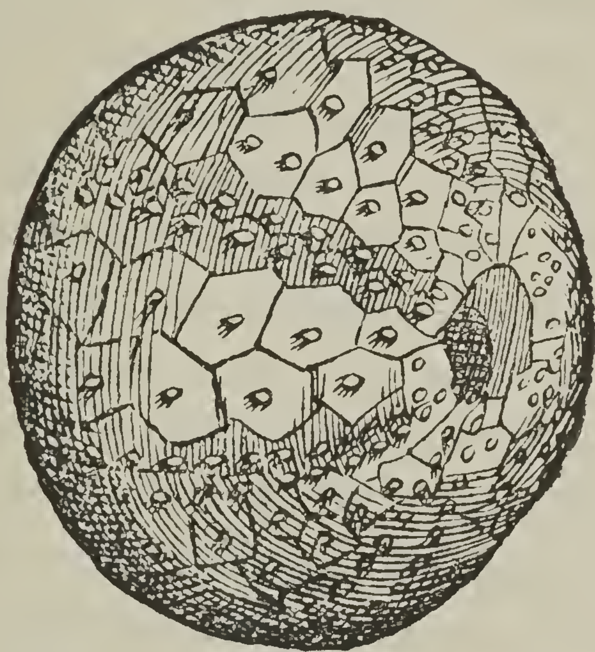


Fig. 1. *Echinus lapis spoliatus a spinis.* From Aldrovandus "De reliquis animalibus exsanguibus". 1606.

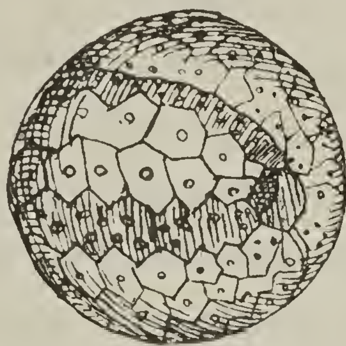


Fig. 2. The same figure, from the edition 1618.

agreed that at first sight one would declare it really to represent *Bothriocidaris*. Still it is not so. The photograph sent me by Jackson showed also some of the neighbouring figures, and these proved beyond the slightest doubt to be redrawn in a somewhat smaller scale from those of the edition 1606. That the same is the case with the figure of the "Echinus lapis spoliatus a spinis" can then no more be doubted, in spite of some minor differences. As further evidence of this may also be mentioned the fact that the work quoted is an opus posthumus, Aldrovandus having died already in 1605. That a quite new figure should then have been introduced in the later edition, while all the rest remains identical,

is certainly very improbable. Herewith I think the myth of Aldrovandus having already known the excessively rare *Bothriocidaris* may be safely dropped.

Apart from this I have nothing specially to critizise in this part of the work. Of considerable interest is the explanation of the plates regarded by Sollas and Spencer as roofing over the ambulacral plates in *Palæodiscus*; Jackson shows conclusively that they are only the narrower ambulacral plates of the dorsal side "brought in mechanical contact with the wider ventral plates by the flattening of the test" (p. 251). The connection between Asteroids and Echinoids based upon these "roofing" plates is thus shown to be without real foundation. (I am likewise satisfied to see that Jackson rejects the hypothesis of A. H. Clark of a nearer relation between Echinoids and Crinoids). For the rest it would carry much too far to mention more closely the many important facts found in this part of the work; I would simply name such points as the comparative study of the ambulacra in the Palæechinidæ (diagrammatically represented on p. 231), the description of the masticatory apparatus in several palæozoic forms (*Archæocidaris rossica*, *Pholidechinus brauni*, *Meekechinus elegans*, the latter presenting the unique feature of having serrate teeth), and the numerous test-analyses after the mode of Lovén (e. g. *Archæocidaris rossica*, *Hyattechinus beecheri*, *Palæechinus quadriserialis*, *Melonechinus multiporus* etc.).

The conclusion must be: most sincere congratulations to Professor Jackson for the completion of this monumental work.

VI. Some abnormalities in Asteroids and Ophiuroids.

(Plate IV).

In the course of my studies on Echinoderms I have now and then come across some more or less remarkable instances of abnormalities, well deserving to be described, but I have always postponed publishing anything about them, until more material had been collected. I may now take this occasion to publish here the description of the cases of abnormalities which I have brought together, as I shall probably otherwise not have the opportunity to do so for several years to come.

That such abnormalities are really more than mere curiosities, needs scarcely be emphasized. Jackson has recently, in his "Phylogeny of the Echini", shown that very interesting general considerations may be derived from similar abnormalities in the Echini. The same will probably be the case with the abnormalities in the other groups of Echinoderms. It is, however, not my plan to enter here on a discussion of the probable meaning of these abnormalities. I intend only to give a simple description of the cases, leaving the discussion of the problems connected therewith for some future occasion.

Meristic variation in the number of rays is of rather common occurrence in both Asteroids and Ophiuroids. I have observed a not inconsiderable number of cases, and several cases have been recorded in literature; especially 4- or 6-rayed specimens of species which are normally 5-rayed appear to be not seldom occurring. On the present occasion, however, these cases are left out of consideration, this note dealing only with abnormal branching of the rays.

The cases recorded in the older literature have been collected by W. Bateson in his "Materials for the study of variation" (1894, p. 440) and by Hamann in "Bronn"[1]. It is quite a number for the Asteroids, while for the Ophiuroids no such cases are recorded.

[1] Bronn. Klassen u. Ordnungen des Thier-Reichs. Echinodermen. II. Die Seesterne. 1899 (p. 737); III. Die Schlangensterne 1901 (p. 894).

Upon the whole the Asteroids appear to be more liable to produce abnormalities and meristic variations than the Ophiuroids, as is also pointed out by Verrill[1]. A few cases have been recorded since the publication of Hamann's work. Ludwig (Arktische Seesterne; Fauna Arctica. p. 470 (1900)) mentions a specimen of *Pteraster militaris* from Spitzbergen in which „ein Arm gegabelt (ist), wodurch das Exemplar unvollkommen sechsstrahlig geworden ist." Michailovsky[2] describes two cases of fusion of rays in *Ctenodiscus crispatus*, in which „je zwei Arme einander beträchtlich genähert und auf eine gewisse Strecke hin gleichsam mit einander verschmolzen sind." Koehler ("Siboga" Ophiuroidea. I. 1904 p. 64) mentions a specimen of *Ophiomusium impurum*, which has one arm bifurcated. Finally Verrill (Op. cit. p. 549) mentions a specimen of *Asterias epichlora* (Brandt), in which one ray is forked about at the middle.

The cases, which I have to mention, are the following.

Asterias rubens Linn. The specimen figured in Pl. IV, Fig. 1 is remarkable through having a pair of symmetrically arranged lateral arms on one arm, Nr. 2 to the right of the madreporite. The two abnormal arms are almost of the same size as the outer part of the arm, from which they proceed. One of the abnormal arms (the left in the figure) presents the interesting feature that the adambulacral spines on nearly the inner half of the arm are regularly biserially arranged, while otherwise they are rather regularly alternating in this species. On the aboral side the colour of the abnormal arms is conspicuously lighter than that of the rest of the animal. On opening these arms I find that the coeca do not send branches into them; likewise it may be noticed that the genital organs do not continue into these abnormal arms.

---

[1] A. E. Verrill. Remarkable development of Starfishes of the Northwest American Coast; hybridism; multiplicity of rays; teratology; problems in evolution; geographical distribution. American Naturalist. XLIII 1909. No. 513 (p. 556).

[2] Echinodermen d. zoolog. Ausbeute d. Eisbrecher Jermaks im Sommer 1901. Ann. Mus. St. Petersbourg. IX. 1904, p. 171.

This interesting specimen was found in the Isefjord, Seeland, off Nykøbing, in the summer of 1904, by Mr. R. H. Stamm, who kindly placed it at my disposal. The same monstrosity occurs in a specimen, which I have found in the Limfjord in 1895. In this case the branching arm is nr. 4 to the right of the madreporite. The anatomical relations are as in the other specimen. The adambulacral spines are normally disposed.

Another interesting specimen of *Asterias rubens* I found in July 1900 in the Little Belt. Here one arm, nr. 3 to the right of the madreporite, is bifurcated. The ambulacral furrow is divided close to the mouth, so that from the oral side there appear to be 6 arms; however, the inner pairs of tubefeet are only biseriate. On the aboral side the arm does not divide until at a distance of a little more than 1 cm. from the disk. (The normal arm length of the specimen is 45 mm.). One coecum passes into each branch; the genital organs occupy the normal position at the base of the arm, not passing into the branches.

Branching arms have previously been observed in *Asterias rubens* by Giebel[1]) and Giard[2]). As mentioned above, Verrill has found a similar case in *Asterias epichlora.* I may mention that I have seen a specimen of *Asterias polaris* M. Tr. in which one arm carries a small sidebranch near the tip. The abnormal arm is nr. 5 to the right of the madreporite (*A. polaris* is 6-rayed). The specimen being dried and rather badly preserved, no further information can be given.

The specimen of *Asterias Mülleri* var. *grönlandica* Stp. figured in Pl. IV, Fig. 2, presents another interesting abnormality. One arm, nr. 2 from the madreporite, has a double ambulacral furrow in its whole length; the space between the two furrows carries along the edges the adambulacral spines, apparently arranged bi-

---

[1]) C. G. Giebel. Über monströse Seesterne. Zeitschr. f. d. ges. Naturwiss. Bd. 20. 1862. p. 386.

[2]) A. Giard. Sur certaines monstruosités de l'Asteracanthion rubens. Compt. Rendus. T. 85. 1877. p. 973.

serially as normal in this form (these spines have been somewhat damaged in the specimen). The interambulacral space is otherwise covered by spines surrounded by pedicellariæ, as on the aboral side. Seen from the aboral side this arm is twice as broad as the other arms; otherwise there is no indication of its being composed of two rays. — With regard to the inner anatomy of this double arm it may be noticed that there are only two coeca and two genital organs. The two coeca, however, both proceed from the right half of the arm, but soon make a little bending so as to occupy each one side of the cavity of the composed arm; in the other half of the arm the stomach is somewhat swollen, protruding as a rounded lobe into the cavity, but there is no indication of a secondary pair of coeca here. — It may be remarked that this species is normally 5-rayed.

I may recall here the remarkable monstrosities of another Asterid from Greenland, *Stichaster albulus* Stimp., which I described in the "Report on the Echinoderms of the Danmark-Expedition[1]). One specimen (Fig. 1) has two arms coalesced in about half their length — or perhaps it ought to be regarded as an abnormal division of an arm; other specimens (Figs. 4, 6) "show a curious crowding of the regenerating arms, some of them being pushed down on the oral side, turning their ambulacral furrow against the ambulacral furrow of the larger arms and their dorsal side downwards, the result being a most curious irregularity."

In Pl. IV. Fig. 3 is represented a specimen of *Astropecten irregularis* (Penn.) with one arm, nr. 2 to the right of the madreporite, bifurcating. There is nothing exceptional to observe in the secondary arm, the inner anatomy shows, as might be expected, one coecum continuing into each branch. This specimen was found at the Zoological Station of Kristineberg, Sweden, near a little island named "Smedjan", in a depth of ca. 10 fathoms, in August 1911. A

---

[1]) Th. Mortensen. Report on the Echinoderms coll. by the Danmark-Expedition at North-East Greenland. Medd. om Grönland. XLV. 1910. p. 268. Pl. XIII. Figs. 1, 3, 4, 6.

specimen of *Luidia sarsi* Düb. Kor. taken on the same occasion has the two arms, nr. 3—4 to the right of the madreporite, coalesced at the base to about 0,5 cm. distance form the disk. The inner anatomy of these coalesced arms rather unexpectedly shows them to be like one branching arm; there is only one coecum in each arm, and the genital organs are developed only along the outer side of each arm.

The most interesting case of abnormalities in Asteroids, which I have found, is that shown in Pl. IV. Fig. 4. It is a specimen of *Ceramaster (Pentagonaster) granularis* (Retz.), which I found in 1911 in Trondhjemfjord, in a dredging off the little island Tautra, in a depth of ca. 200 m. One arm, nr. 3 to the right of the madreporite, is considerably longer than the others and has its ambulacral furrow divided from the middle of the arm, the outer part having two parallel ambulacral furrows, separated by a keel formed by a row of adambulacral plates, somewhat broader than the normal ones at the outer sides; in some places there are two, irregular plates in the keel between the furrows. Most of the adambulacral spines on this abnormal part of the arm were abraded, but it appears that they did not differ in their arrangement from those along the normal furrows. — More interest, however, is afforded by the dorsal side of the disk through the fact that a number of the paxillæ, especially those along the middle line of each arm carry small pedicellariæ, each placed in a little deepening (Textfigure 1). In this species otherwise pedicellariæ do not occur; but in other species of the genus a similar form of pedicellariæ occurs in the dorsal paxillæ (besides other pedicellariæ on the oral side), e. g. in *C. japonicus* (Sladen), *C. patagonicus* (Sladen), *C. leptoceramus* (Fisher). It may then perhaps not be unreasonable to see

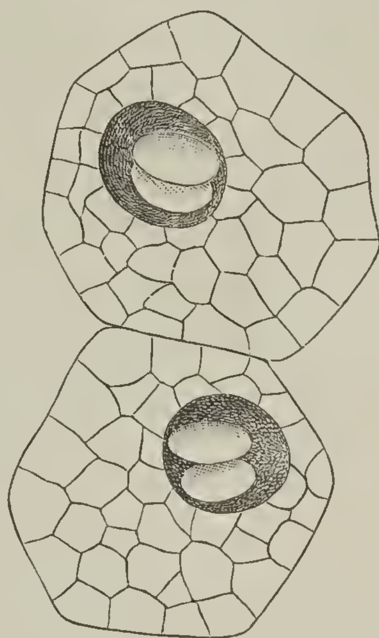


Fig. 1. Two paxillæ with pedicellariæ from the abnormal *Ceramaster granularis*. $^{30}/_{1}$.

in this abnormal appearance of pedicellariæ a case of atavism; the same may perhaps be the case with the unusual length of the arms in this specimen, also the four normal arms being conspicuously longer than normally in this species, which is otherwise nearly pentagonal. — I was at first inclined to regard this remarkable specimen as a hybrid between *Ceramaster granularis* and *Hippasteria phrygiana* (Parel.) both of which are common in the Trondhjemfjord. The above explanation, however, appears to me more natural; the pedicellariæ are not like those of *Hippasteria*, and there are no other characters clearly recalling that species.

In Ophiurids the only case of abnormally branching arms which I have found recorded is that of *Ophiomusium impurum* from Koehler, mentioned above. It appears that such abnormalities are comparatively much rarer in Ophiurids; the three cases, which I shall describe here, are then of some interest as a relatively very considerable addition to the knowledge of such monstrosities in this group of Echinoderms.

In Pl. IV. Fig. 5 is represented a specimen of *Ophiura (Ophioglypha) Sarsi* Ltk. from West Greenland, taken in the Northern Strømfjord in 1911 by Dr. V. Nordmann, which shows the abnormality that one arm has been divided from the base, the specimen having thus six arms. The inner armplates are very irregular, as are upon the whole the corresponding mouth edge and interambulacrum. The madreporite is not discernible, so that the serial number of the monstrous arm cannot be ascertained.

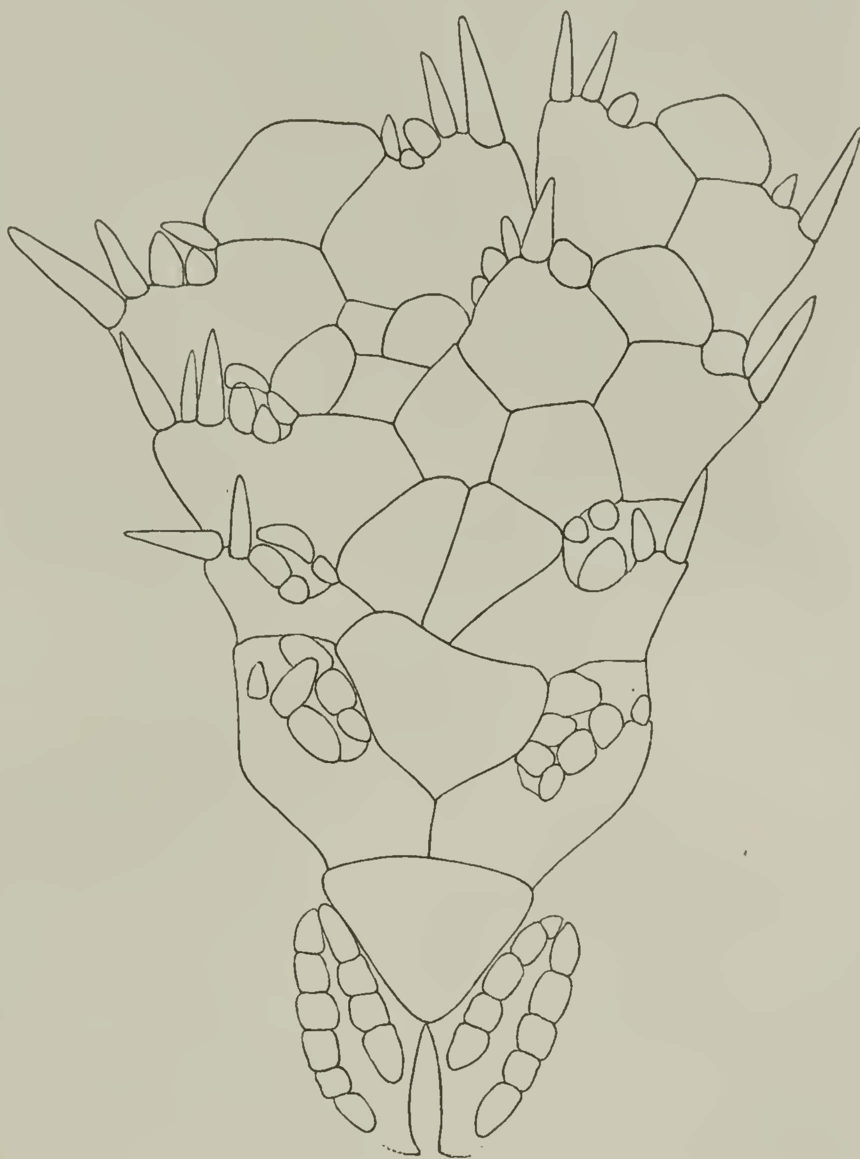
A somewhat similar monstrosity is found in *Ophioscolex prolifer* Studer, the specimen described and figured by Studer[1]) having a small arm protruding from the disk between two normal arms; it is, however, as appears from the figure 13 c. of Studer's memoir, not a branching of an arm, but a formation of a new arm

---

[1]) Th. Studer. Übersicht über die Ophiuriden, welche während d. Reise S. M. S. Gazelle um die Erde 1874—1876 gesammelt wurden. Abhandl. d. K. Preuss. Akad. d. Wiss. Berlin. 1882. p. 28. Taf. III, Fig. 13 a—e.

in the middle line of an interradium. Studer is of opinion that „der Ursprung eines neuen Armes zwischen zwei normalen deutet wahrscheinlich die Einleitung zu einem Selbstheilungsprocesse an". I do not think that suggestion very probable. In other self-dividing Ophiurids the division is not preceded by the formation of one or more new arms between the old. The case of *Ophioscolex prolifer* evidently only represents a monstrosity, not a usual instance of meristic variation.

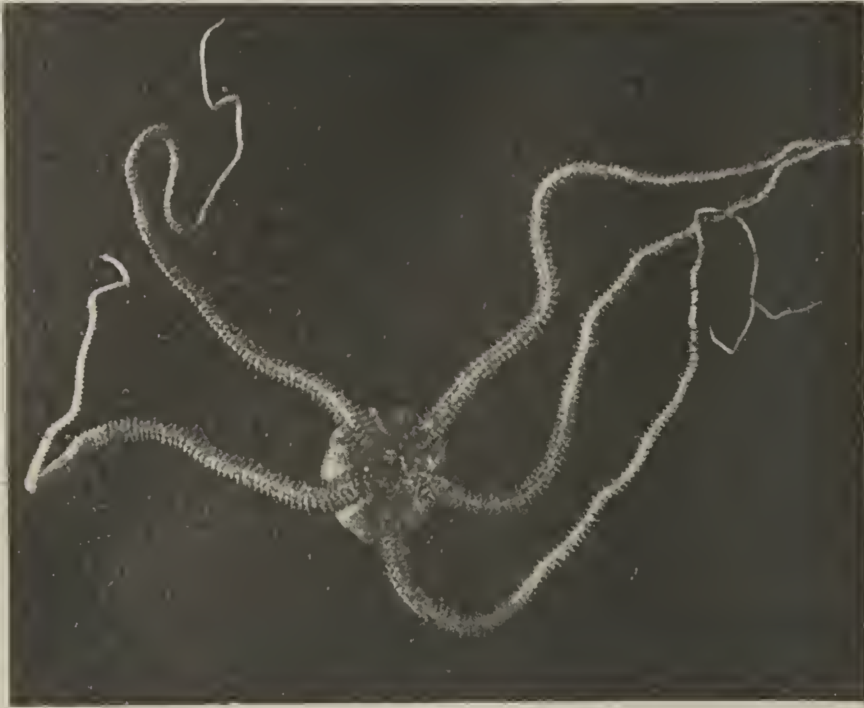
A specimen of *Ophiura (Ophioglypha) albida* Forbes, which I have dredged at Herthas Flak in the northern Kattegat ("Ragna" 1905) has one arm bifurcating (Pl. IV. Fig. 6). As seen from the analysis given in textfigure 2 the point of division is about at the hird joint. The second ventral plate is abnormally formed, the third is divided by a longitudinal line. The fourth ventral plate of the main arm is divided into four small plates; between the ventral plates 3 and 4 are seen two pentagonal plates, the inner of which evidently represents the one side plate of the third joint, while the interpretation of the other remains uncertain. From the fourth joint both arms have normally shaped plates. Seen from



Textfigure 2. The inner joints of a bifurcating arm of *Oph. albida.* $^{20}/_{1}$.

the dorsal side the secondary arm is considerably lower than the primary, which latter has the dorsal plates 3—4 irregularly divided. The comb of papillæ comprises both arms.

The last case of forking arms in Ophiurids, which has come to my knowledge, is represented in textfigure 3. It is a specimen of *Amphiura Chiajei* Forbes from the Sound, found by Mr. R. H. Stamm, who kindly placed it at my disposal. As seen by the figure the forking is near the end of the arm. Unfortunately the arm has been somewhat twisted in the bifurcating region so that it would be necessary to cut it off in order to study the relation of the plates at the division point, but that did not seem desirable and I have preferred to keep the specimen intact. If it proves of importance to have the relation of the plates here made clear, it can always be done later on.



Textfigure 3. Amphiura Chiajei, with bifurcating arm. 1/1.

Note. In my note "On natural hybrids of Echinoderms"[1]) I have given as the only cases of natural hybrids in Asteroids recorded in literature *Asterias berylinus* × *pallidus* (from A. Agassiz) and *Asterias groenlandica* × *hyperborea* (from Kalischewskij). I have there overlooked two cases, both much better

[1]) Echinological Notes. III.—IV. Vid. Medd. Naturh. Foren. Bd. 63. 1911. p. 58—66.



FOTOTYPI. PACHT & CRONE

than the two above. One of these is the *Palmipes lobianci* Ludw., which represents, according to Ludwig, most probably a hybrid between *Palmipes membranaceus* and *Asterina gibbosa*[1]). The other case is mentioned by Verrill (Op. cit. p. 544), who reports the rather common occurrence at Sitka a. o. places on the North American West Coast of hybrids between *Asterias epichlora* (Br.) and *Pisaster ochraceus* (Br.), the former being a small, usually six-rayed, diplacanthid species, the latter a large, coarse, five-rayed, monacanthid species. Verrill also suggest the existence of hybrids between *Asterias epichlora* and *A. hexactis* (St.), and of either of these species with *Asterias Troscheli* (St.). It would then appear that this region is unusually favourable for the study of hybridism.

[1]) H. Ludwig., Die Seesterne des Mittelmeeres. Fauna u. Flora d. Golfes v. Neapel. 24. Monogr. 1897. p. 267. Professor Ludwig has kindly called my attention to this form, which I had forgotten.

Explanation of Plate IV.

Fig. 1. *Asterias rubens* L. Abnormal specimen from the Isefjord.
— 2. *Asterias Mülleri* var. *grönlandica* Stp. Abnormal specimen from Greenland.
— 3. *Astropecten irregularis* (Penn.). Abnormal specimen from the coast of Bohuslän.
— 4. *Ceramaster (Pentagonaster) granularis* (Retz.). Abnormal specimens from the Trondhjemsfjord.
— 5. *Ophiura (Ophioglypha) Sarsi* Ltk. Abnormal specimen from the Northern Strömfjord, Greenland.
— 6. *Ophiura (Ophioglypha) albida* Forbes. Abnormal specimen from the northern Kattegat.

All the figures are represented in natural size.

22.—5.—1913.

On some South-American species of the genus *Mydæa*, parasitic on birds.

By

Dr. ***J. C. Nielsen.***

I.

In 1911 I published a little paper: *Mydæa anomala* Jaenn., a parasite of South-American birds[1]) in which I described the three larval stages, the puparium and the imago of a dipterous insect, *Mydæa anomala*, which Mr. J. Mogensen had collected in December 1910—January 1911 in Concepcion, Argentina. The larvæ of the fly developed as subcutaneus parasites in tumors on various birds, both older and younger ones *(Spermophila gutturalis, Mimus modulator, Homorus lophotes, Pitangus sulfuratus bolivianus).* With regard to further details, as well as to the descriptions I may refer to my above cited paper, in which were also reproduced photographs of infested birds. The fly corresponded very well with the description of *Mesembrina (Mydæa) anomala* by F. Jaennicke[2]), I therefore did not hesitate in identifying the fly with that species.

In 1912 I received from Mr. J. Mogensen a small collection consisting of bred flies, puparia and third stage larvæ of a *Mydæa*-species which he had found parasitic on *Xiphocolaptes albicollis* in Bompland Missiones, Argentina. In letters to me Mr.

---

[1]) In Videnskabelige Meddelelser fra den naturhistoriske Forening i København. Bd. 63. 1911. p. 195.

[2]) F. Jaennicke: Neue exotische Dipteren (Abhandl. herausgeg. v. d. Senckenbergischen naturf. Gesellschaft VI, 1866—67 p. 377).

Mogensen gave as his opinion, that the fly belonged to another species than those which he had formerly found, because the larvæ while in the tumors were surrounded by a layer of a yellowish, fatty substance, which he had not observed in the case of the other species and because the larvæ before pupating made a cocoon of earth by means of a bright liquid which later on changed into a white substance.

When I got the package the specimens were in a rather bad condition; the vial was broken, the larvæ dried up and the flies very dirty. At first I believed that it was the same species, which I had described under the name of *Mydæa anomala* as the flies answered well to Jaennickes description, and the differences which I could observe between the flies and those which I formerly had examined seemed to be very slight; but as soon as I had submitted the larvæ and puparia to a closer examination I saw that is was a distinct species. The question was now to solve, which of the two species was the true *M. anomala.* After the description of Jaennicke I was not able to decide the question; therefore I adressed myself to the Museum in Vienna, where the type specimen of *M. anomala* is preserved. By the permission of the direction of the Museum I received the type and by a thorough comparison I succeeded in finding that the species which Mr. Mogensen had found in 1912 was the true *M. anomala* Jaenn., while the fly which I had called by this name in 1911 in reality belongs to a new species, which I propose to name *Mydæa torquans* n. sp.

In this paper I shall give a description of *M. anomala*; as to the description of *M. torquans* I refer to my previous paper. Here I may only remark, that *M. anomala* resembles very much *M. torquans* and had it not been for the absolute specific differences in the larvæ and puparia I should have hesitated in separating the two species. There are, however, some differences: *M. anomala* is a little smaller and of a much paler colour, the pleura being quite pale, while they are grey in *M. torquans*; in the male of

M. anomala the frons is a little narrower, and the reddish frontal triangle disappears upwards, while in *M. torquans* the latter is fairly distinct up to the vertex; in the female the frons is considerably narrower than in *M. torquans*, and the middle stripe not broader than the sides; the sides and the cheeks are yellow in *M. anomala* and silvery in *M. torquans*; finally the female of *M. anomala* has the legs coloured like the male, while in *M. torquans* they are darker.

Besides this there is also a biological difference between the two species. As above mentioned Mr. Mogensen has based his opinion of the distinctness of *M. anomala* upon the fact, that the larva produces a cocoon, and he has told me, that he never observed such cocoons by his breedings of *M. torquans*. After this we can admit, that the last named species pupates without cocoon. In my previous paper I have mentioned a few literary records of dipterous larvæ parasitic on birds. Among these there are two[1]) in which the authors record the cocoon making habits of the larva of *Aricia pici* Macq.[2]). Also Aug. Busck[3]) mentions that *Mydæa pici* Macq. pupates in a cocoon of particles of earth glued together by a glistening white excretion, while Townsend[4]) in a paper containing the description of *Mydæa spermophilæ* n. sp. does not mention a cocoon. As it is possible that there are more *Mydæa* species of parasitic habits I shall not make any attempt at identifying the flies mentioned by the said authors with my two species as I have not had the opportunity of seing the type specimens.

---

[1]) Macquard: Notice sur une nouvelle espèce d'Aricia (Ann. d. la Soc. entom. de France 3. Série I. 1853. p. 655).
R. Blanchard: Contributions à l'étude des Diptères parasites. Troisième série. (Ibid. LXV 1896 p. 652).

[2]) After the determination of the late Prof. Brauer the fly which has formed the object of the investigations of Prof. Blanchard is identical with *M. anomala* Jaenn.; it is sure that *Aricia pici* Macq. is a *Mydæa*, but the species is not recognizable after the description and the figure of Macquard.

[3]) Aug. Busck: Mydæa pici Macq. (Proc. Entomol. Soc. Washington VIII. 1906 p. 2).

[4]) C. Th. Townsend in Transacts. Amer. Entom. Soc. XXII 1895 p. 79.

II.

The larva in the third stage: As all of the larvæ were dried up and shrivelled I cannot give the exact length, but I think that the fullgrown larva measures about 12—13 mm or perhaps a little more. The shape of the larva is fusiform, the posterior end obliquely truncate, in the middle deeply excavated with the posterior spiracles in the centre of the excavation. The head has on each side a pointed optical tubercle and a little flattened papilla with some sense facettes. On each side of the mouth there are some larger spines and some rows of minute spines. The base of the mouth-hooks is broad, anteriorly truncate and posteriorly with a short rounded tooth; the tip is regularly curved; the anterior pharyngeal plates are of the same length as the mouth-hooks, at the upper margin of each of them is found a forward pointing spine, which is smaller than in the larva of *M. torquans*; the posterior pharyngeal plates are about 6 times as long as the mouth-hooks. The spine armature is found on the anterior margin of segments 2—11 and on the posterior margin of segments 4—11, on segment 11 the spines are distributed almost over the whole segment; segment 12 is provided with spines except in the excavation at the end. The anus lies on the ventral side of the last segment. The spiracles are different from those in *M. torquans*: the anterior (Fig. 1) by ending in two not prominent rounded knobs [1]), and the posterior (Fig. 2) by having a less regularly rounded frame and more sinuated respiratory areas. The puparium (Fig. 4). Length 7—8 mm; cylindrical, somewhat pointed at the ends; the posterior end deeply excavated, the borders of the excavation sharp; brown, not shining, the surface finely rugose, the last segment strongly rugose; the anterior spiracles not prominent; no trace of pupa spiracles.

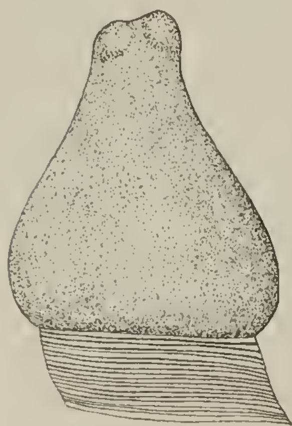


Fig. 1. *Mydæa anomala*. Larva. 3. Stage. Anterior Spiracle.

[1]) In *M. torquans* the spiracle terminates by 4 rather long knobs.

The puparia of the two species can be distinguished at the first glance. The puparium of *M. torquans* (Fig. 3) is ovate or somewhat broader behind the middle, the surface is smooth and shining and the borders of the excavation of the last segment rounded; in *M. anomala* the shape is cylindrical, the surface not shining and the excavation of the last segment much greater with sharp borders.

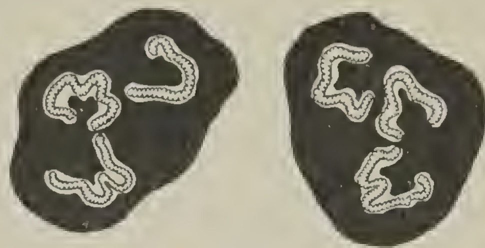


Fig. 2. *Mydæa anomala* Larva. 3. Stage. Posterior spiracles.

The fly: Male. Head short, frons not prominent, eyes narrowly separated; the ocellar tubercle dark; frons whitish or silvery grey, the cheeks of the same colour; the middle frontal triangle reddish brown. Epistoma and jowls pale brownish yellow. The lower frontal bristles rather long, the upper ones shorter. The jowls with short, yellow hair; the bristles at the oral aperture black, the vibrissa long and thick, more than twice as long as the other bristles. Antennæ reddish yellow, arista brownish or dark brown, long feathery, the base yellow. Palpi yellow. Thorax slate gray, with a slightly translucent brownish ground colour; on the disc there are four dark or blackish stripes, the two median a little diverging backwards and abbreviated, the lateral interrupted at the transverse furrow and thus each forming two somewhat cuneiform spots. The humeral callus yellow. The disc uniformly covered with short hair. There are three humeral bristles, the innermost small and weak; only two acrostical bristles, one on each side in front of the scu-

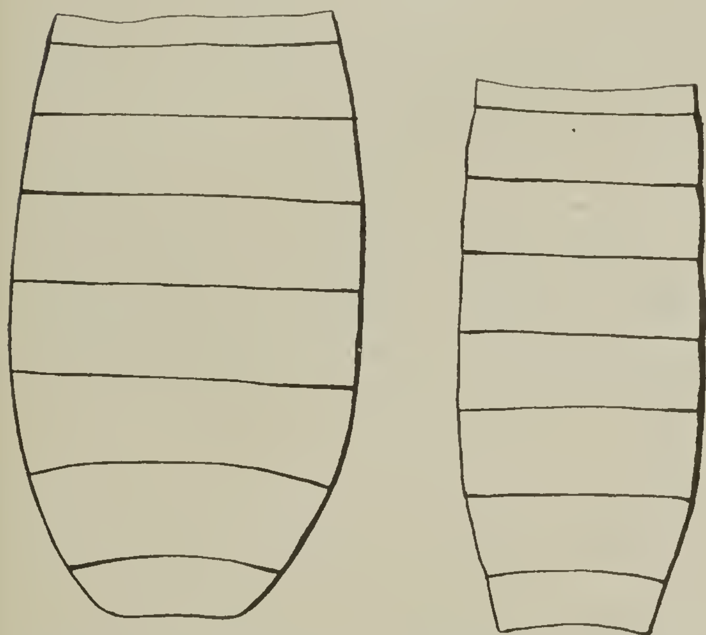
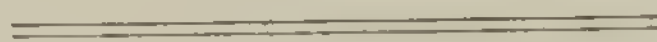


Fig. 3, 4. Puparia of *Mydæa torquans* and *M. anomala*. After the emergence of the flies.

tellum, further two anterior and four posterior dorsocentral bristles, one posthumeral bristle, two notopleural, one intraalar, three supra-alar and two postalar bristles; the præsutural bristle is placed lower than the posthumeral. Scutellum with eight marginal bristles. Pleura yellow or pale brownish yellow, the sternopleura a little greyish below. Abdomen short oval, yellow, the fourth and fifth segments dark, greyish brown, and also the hind part of the third segment darker; the second and third segments have a distinct narrow, brown hind margin, and the third segment an indication of a dark middle stripe. Venter yellow, darker towards the apex. Legs yellow, tarsi a little darker towards the apex. Front femora with a dorsal, posterior and postero-ventral row of long fine bristles, middle femora chiefly short haired; hind femora with some short, but somewhat strong anterior bristles, forming about three rows, but the middle and the lower rather incomplete. Front tibiæ without bristles, middle tibiæ with two somewhat strong posterior bristles, hind tibiæ a little curved, with two antero-dorsal bristles and some fine antero-ventral bristles. Wings about hyaline, middle cross-vein a little seamed, posterior cross-vein doubly curved.

Female. Vertex and frons broader than in the male but still rather narrow; the middle stripe brownish red, the sides yellow. Abdomen considerably darker than in the male, only the base yellow.

Length about 7 mm.



26.—5.—1913.

Medusæ collected by the "Tjalfe" Expedition.

By

Paul L. Kramp.

During the summers of 1908 and 1909 the Danish brig "Tjalfe" has carried out fisheries investigations in the Greenland waters, especially off the west coast of Greenland, under the direction of Mr. Ad. S. Jensen. The scientific investigations were made partly by means of trawl and dredge, partly also by means of pelagic nets and young-fish trawl. By these investigations a comparatively large material of medusæ was brought up. 22 species were collected. A great deal of the material was preserved in formaline and mostly in fairly good condition. It being, however, impossible to preserve the whole of the material Mr. Ad. S. Jensen put down notices in his journal with a short characterisation of the different species. These notices, as a rule, have been sufficient for identifying the species, and I have, therefore, included also the non-preserved material in the present paper, but with an asterisk (*) at the number of station in question. — Most of the 22 species were previously known from Greenland, being recorded in Levinsen's: „Meduser, Ctenoforer og Hydroider fra Grønlands Vestkyst", 1892. — *Atolla Bairdi* is mentioned by Vanhöffen (1906) as occurring in the deep of the Davis Strait (taken by the "Ingolf" Expedition). — 6 species are new for Greenland. Two of these, *Melicertum campanula* and *Tiara pileata* are known from both sides of the northern Atlantic area, the four are deep-sea medusæ, found in the Atlantic water of the deep Davis Strait together with *Atolla Bairdi* and *Periphylla hyacinthina.*

Zoogeographical Remarks on the 6 Species of Deep Sea Medusæ.

1 Leptomedusa (*Thaumantias rubrum* (Fewkes)), 2 Trachymedusæ (*Aglantha rufobrunnea* n. sp. and *Pantachogon rubrum* Vanhöffen), 1 Narcomedusa (*Aeginura Grimaldii* Maas) and 2 Acraspedæ (*Atolla Bairdi* Fewkes and *Periphylla hyacinthina* Steenstrup) were taken in the deep-water hauls of the "Tjalfe" Expedition.

Thaumantias rubrum Fewkes is known, hitherto, only from deep water in the northern Atlantic, being described by Fewkes (1882) from off New Englands coast; it has not been recorded later on from other places, but I have seen several specimens, taken by the "Michael Sars" from deep water in the northern Atlantic in 1910. The "Tjalfe" has taken it in the deep Davis Strait about 63° and 64° n. Lat.

Aglantha rufobrunnea n. sp. was taken in the Davis Strait, 63° 18′ n. Lat., with 1530 m. wire. The nearest related species is *Aglantha ("Melicertum") proboscifer* (Maas), taken from deep water in the eastern tropical Pacific.

The four other species are known from the tropical Atlantic deep sea.

Atolla Bairdi Fewkes is only known from the Atlantic area, found in the tropical (Vanhöffen 1902 a) and the northern boreal depths whence it extends into the Davis Strait, being taken as far northwards as 64° 35′ n. Lat.

Periphylla hyacinthina Steenstrup has a similar distribution, but it occurs somewhat more abundantly and penetrates further northwards, being known from Spitzbergen and is common in the Irminger Sea; furthermore it is known from the tropical depths of the northern Indian Ocean ("Valdivia", Vanhöffen 1902 a). The "Tjalfe" found a great many specimens as far northwards as 66° 45′ n. Lat., close to the submarine ridge between Davis Strait and Baffins Bay. In the colder latitudes it may be seen occasionally in the upper layers of the water.

Aeginura Grimaldii Maas is still more widely distributed in Oceanic depths, being known (under different names, see below, p. 276) from the northern Atlantic, the tropical Atlantic, the Indian Ocean, the Malayan Archipelago, the eastern tropical Pacific and the Bering Sea (Bigelow 1913), alltogether in deep water. — In the Davis Strait it was found at four stations from 60° 07′ to 64° 06′ n. Lat. with 1200—2000 m. wire.

None of these species are known from the Antarctic area.

Pantachogon rubrum Vanhöffen, possibly identical with *P. Haeckelii* Maas from the Irminger Sea and Spitzbergen. *P. rubrum* is known from deep water in the tropical Atlantic, the tropical Indian Ocean, the Malayan Archipelago, and the Antarctic Ocean, being found abundantly in the area south of Africa between $55^1/_2$° and 64° s. Lat. (it must be remembered that the southern point of Africa is at 35° s. Lat.). — The "Tjalfe" has taken the same species in the deep Davis Strait from about 60° to 64° n. Lat.

Maas, in some of his excellent works on medusæ, has dealt with the problem of "bipolarity" as regards the medusæ, and he states (in "Fauna arctica" 1906) that among the holoplanctonic medusæ no species at all are common both to the northern and the southern Polar area, but a few genera are. As to the deep-sea medusæ, particularly, he finds that some species are common to the tropical Oceanic depths and one or the other Polar area, but no species is common to all the three regions; thus, in the medusæ we find a well marked "unipolarity." As especially instructive he notes the three species of *Periphylla*, *dodecabostrycha* being known hitherto only from the tropical Oceanic depths, widely distributed towards east and west, *regina* from the tropical depths of the Pacific and the Atlantic and from the Antarctic, and *hyacinthina* from the tropical depths of the Indian Ocean and the Atlantic and from the arctic and northern Atlantic. — Now, *Pantachogon rubrum* has been found in the depths of the tropical, the antarctic and the arctic Atlantic areas. It is true, it must be admitted that the depths of the Davis Strait are not arctic, the

hydrographical conditions and the fauna being quite Atlantic, but the main point is that the species has spread very far towards both Polar areas (see the Addenda). Every deep sea organism spreading northwards in the Atlantic will meet the submarine ridge between Scotland, the Faeroes, Iceland, Greenland and Baffins Land; only between Iceland and Greenland will there be any probability of it penetrating into the true arctic deep, and if *P. Haeckelii* is identical with *P. rubrum*, this species has really happened to do so; if not, then in every case, the species in question demonstrates the possibility of spreading from the tropical oceanic depths towards both poles of the earth; it is not easy to comprehend, why such spreading should be impossible, as the hydrographical conditions are nearly the same in every region of the Oceanic depths as far as the deep area extends without being limited by lands and submarine ridges[1]). Only comparatively few examples of this mode of distribution seem to be known with certainty, *P. rubrum* being the first indubitable example among the medusæ. But it must be remembered that our knowledge of the fauna of the Oceanic depths is still very insufficient. The deep sea investigations of the "Tjalfe" in the Davis Strait seem to me to be of great importance in this respect.

List of Stations, where *Medusæ* have been captured.

No. of Station	N. Lat.	W. Long.	Depth in meters	Apparatus used	Length of wire (meters)	Date	Hour
1 a	59° 25′	22° 56′		Young-fish trawl	175	12.-5. 1908	8 p. m
6	58° 24′	34° 53′		Ringtrawl	(Surface)	16.-5. „	11 p. m
9	58° 33′	35° 55′		„	600	17.-5. „	1 p. m
13	58° 08′	39° 10′		Young-fish trawl	40	26.-5. „	8 p. m
14	58° 08′	39° 12′		Ringtrawl	150	26.-5. „	9 p. m
15	58° 08′	39° 24′		„	500	26.-5. „	10^{30} p. m
30 a	63° 04′	56° 32′		„	500	7.-6. „	4 p. m
33 b	63° 25′	54° 34′		„	200	8.-6. „	10 a. m

[1]) Compare Ortmann's and Chun's hypothesis, that the Arctic, the Antarctic and the oceanic depths make one special zoogeographical area.

No. of Station	N. Lat.	W. Long.	Depth in meters	Apparatus used	Length of wire (meters)	Date	Hour
35 a	63° 40′	52° 42′		Ringtrawl	30	9.-6. 1908	8 a. m.
42	63° 55′	52° 21′	57	"	70	10.-6. "	7 p. m.
54	Godthaab Fjord			"	70	15.-6. "	7 p. m.
71	63° 57′	53° 10′		"	70	23.-6. "	10 a. m.
73	63° 55′	53° 14′		"	200	23.-6. "	11 a. m.
74	63° 53′	53° 18′		"	500	23.-6. "	12 noon
76	63° 49′	53° 27′	1300	"	1000	23.-6. "	5 p. m.
79 a	64° 45′	54° 02′		"	30—100	25.-6. "	9 p. m.
81 a	65° 45′	54° 07′	120	"	0—100	26.-6. "	2 p. m.
83 a	66° 38′	54° 35′	60	"	25	27.-6. "	6 a. m.
90	Holstensborg			Pelagic net		30.-6. "	
100 c	66° 44′	56° 08′	ca. 330	Ringtrawl	70	5.-7. "	
100 d	"	"	"	Eel-trawl	(bottom)	" "	
105 b	67° 22′	56° 14′		Ringtrawl	0—100	7.-7. "	
109 b	68° 34′	53° 45′		"	70	9.-7. "	8 p. .
12	68° 49′	52° 48′		Pelagic net	(surface)	11.-7. "	9^{30} p. m.
13 b	69° 08′	53° 12′	265	"	(surface)	12.-7. "	5 a. m.
24	69° 17′	52° 14′	430—440	Ringtrawl	150	16.-7. "	4 p. m.
25	"	"	"	"	550	" "	5 p. m.
26 b	"	"	"	"	(surface)	" "	6^{30} p. m.
33	69° 08′	51° 09′		"	75	17.-7. "	6 p. m.
58	70° 51′	54° 14′		Pelagic net	(surface)	30.-7. "	10^{45} a. m.
60	70° 48′	52° 47′		"	(surface)	" "	10^{45} p. m.
71	70° 41′	52° 07′	727	Ringtrawl	800	6.-8. "	
73	70° 44′	52° 20′		"	150	6.-8. "	
74	70° 45′	52° 21′	ca. 480	"	50	6.-8. "	
78	69° 46′	55° 00′		Pelagic net	(surface)	8.-8. "	11^{30} a. m.
79 a	69° 28′	54° 54′	220	Ringtrawl	40 & 80	9.-8. "	11^{30} a. m.
31	Between Fortunabay and Point of Godhavn			"	80 & 40	10.-8. "	11 a. m.
5	68° 47′	52° 40′	240	"	80 & 40	11.-8. "	
8	Egedesminde			Pelagic net	(surface)	11.-8. "	
5 a	68° 40′	53° 12′	410	"	(surface)	17.-8. "	
5 b	"	"	"	Ringtrawl	80	" "	
6 c	"	"	"	"	30	17.-8. "	
7 a	68° 24′	54° 40′		"	80	18.-8. "	
7 b	"	"		"	30	" "	
0 a	68° 05′	55° 15′	83	"	80	19.-8. "	
1 a	68° 04′	55° 15′		"	140	" "	
1 b	"	"		"	(surface)	" "	
3	67° 10′	54° 44′	66—84	"	80—100	20.-8. "	
4	66° 55′	55° 52′	154	"	140	21.-8. "	7^{20} a. m.
5	66° 52′	55° 58′	ca. 170	"	80	" "	8 a. m.

No. of Station	N. Lat.	W. Long.	Depth in meters	Apparatus used	Length of wire (meters)	Date	Hour
207	66° 53′	56° 14′		Ringtrawl	80 & 140	21.-8. 1908	8^{30} p. m.
208	66° 54′	56° 07′		"	250	" "	9^{30} p. m.
211	66° 55′	54° 37′	66	"	80	23.-8. "	
218	66° 45′	53° 51′	ca. 350	"	80	27.-8. "	8^{10}—8^{40} p.
219	66° 36′	54° 05′		"	80	28.-8. "	12 night
220	66° 29′	54° 12′		"	80	" "	5 a. m.
221	66° 11′	54° 27′		"	80	" "	12 noon
222	66° 08′	54° 27′		"	80	" "	1 p. m.
223	66° 06′	54° 27′		"	150	" "	1^{30} p. m.
224	66° 03′	54° 24′	ca. 130	"	200	" "	2^{30} p. m.
225	66° 01′	54° 23′		"	150	" "	3^{30} p. m.
227	64° 51′	53° 23′		"	150	29.-8. "	10 a. m.
228	64° 20′	53° 03′		"	150	" "	4^{45} p. m.
229	"	"		"	80—120	" "	5^{30} p. m.
230	64° 11′	52° 33′		"	130	30.-8. "	5 a. m.
231	64° 10′	52° 29′		"	120 & 80	" "	5^{45} a. m.
233	Godthaab Fjord, off Faltings harbour			"	150	" "	2^{30} p. m.
234	"	"		"	120 & 80	" "	
235	"	"		"	30	" "	3 p. m.
236	"	"		"	30	" "	4^{30} p. m.
241	63° 49′	52° 23′		"	80	3.-9. "	6 p. m.
242	"	"		"	150 & 120	" "	6^{30} p. m.
243	63° 12′	51° 20′		"	80	4.-9. "	12 noon
244	"	"		"	150 & 120	" "	12^{30} p. m.
270	62° 21′	51° 31′	158	"	80	24-9. "	8 a. m.
272	62° 21′	51° 32′	> 2000	"	200	" "	2 p. m.
274	62° 20′	51° 37′		"	80	" "	3 p. m.
285	57° 51′	43° 48′		"	1000	29.-9. "	1^{30} p. m
296	59° 10′	27° 44′		"	(surface)	4.-10. "	8 p. m.
298	59° 41′	25° 02′		"	500	6.-10. "	11 a. m.
299	59° 41′	24° 49′		"	200 & 80	" "	11^{30} a. m.
304	59° 28′	33° 05′		"	(surface)	26.-4. 1909	10 p. m.
305	58° 25′	38° 15′		Pelagic net	(surface)	27.-4. "	9^{30} p. m.
314	59° 13′	48° 46′		Ringtrawl	80	30.-4. "	2 p. m.
315	"	"		"	400	" "	2^{30} p. m.
316	58° 59′	50° 48′		"	500	1.-5. "	7 p. m.
320	60° 07′	48° 26′		"	(surface)	3.-5. "	8^{30} p. m.
321	"	"		do., with closing apparatus	600	" "	8^{30} p. m.
322	"	"		do.	2000	" "	10 p. m
325	61° 10′	52° 53′		Pelagic net	(surface)	5.-5. "	9^{45} p. m.
326	62° 05′	53° 41′		Ringtrawl	100	6.-5. "	2^{30} p. m.

No. of Station	N. Lat.	W. Long.	Depth in meters	Apparatus used	Length of wire (meters)	Date	Hour
327	62° 05′	53° 41′		Ringtrawl	200	6.-5. 1909	3^{30} p. m.
330	62° 36′	54° 12′		″	(surface)	″ ″	10^{15} p. m.
331	″	″		″	100	″ ″	10^{30} p. m.
332	63° 18′	54° 55′	1300	″	80	7.-5. ″	10 a. m.
333	″	″	″	″	1530	″ ″	11 a. m.
334	″	″	″	″	70	″ ″	1 p. m.
336	64° 06′	55° 18′	1040—1100	″	1200	8.-5. ″	
338	64° 01′	55° 30′	1185	do., with closing apparatus	1400 & 1500	″ ″	
344	64° 22′	55° 48′	1040	do.	1200	10.-5. ″	3 p. m.
345	64° 22′	55° 51′		do.	1000	″ ″	4^{30} p. m.
346	64° 22′	56° 00′		Ringtrawl	800, 600 & 400	″ ″	
348	64° 35′	56° 18′		″	900	11.-5. ″	2 p. m.
352	65° 18′	55° 30′	780	″	100	12.-5. ″	2^{15} p. m.
363	66° 21′	57° 04′	680	″	800	18.-5. ″	
373	66° 45′	56° 31′		″	750	21.-5. ″	
377	near Holstensborg			Pelagic net		24.-5. ″	
386	66° 53′	53° 53′		″		28.-5. ″	10 p. m.
388	66° 50′	54° 55′	71	″	(surface)	29.-5. ″	6 a. m.
401	64° 55′	56° 13′		Ringtrawl	100	1.-6. ″	7 p. m.
405	64° 25′	56° 12′		″	100	2.-6. ″	2 p. m.
411	64° 21′	55° 10′		″	120 & 100	3.-6. ″	
412	64° 21′	54° 36′		″	100 & 120	″ ″	
413	64° 21′	53° 57′	170	″	120 & 100	″ ″	
415	64° 19′	53° 07′		″	100 & 120	4.-6. ″	9^{30} a. m.
416	64° 19′	53° 09′		″	100	″ ″	10 a. m.
417	65° 13′	53° 59′		″	100 & 120	6.-6. ″	11^{30} a. m.
418	65° 09′	53° 53′		″	(surface)	″ ″	1 p. m.
422	65° 06′	54° 19′	83	Dredge	(bottom)	7.-6. ″	
23	65° 03′	54° 16′		Ringtrawl	120, 100 & 80	″ ″	3 p. m.
24	64° 41′	53° 46′		″	120, 100 & 80	″ ″	11 p. m.
25	64° 24′	53° 05′		″	120, 100 & 80	8.-6. ″	7 a. m.
26	western side of Fyllas Bank		83	″	120, 100 & 80	″ ″	
27	63° 54′	53° 15′	988	″	120, 100 & 80	″ ″	6^{30} p. m.
30	63° 30′	53° 08′		″	100	9.-6. ″	3^{30} a. m.
32	63° 09′	53° 43′		″	100	″ ″	11 a. m.
33	63° 05′	54° 21′		″	120—80	″ ″	4 p. m.
34	62° 53′	54° 15′	1660	″	1500 & 1200	″ ″	
35	62° 59′	52° 58′		″	120 & 100	10.-6. ″	
36	63° 16′	52° 21′	644—1700	Trawl	not touching the bottom	″ ″	
39	63° 05′	51° 19′		Ringtrawl	100	11.-6. ″	1^{15} a. m.
56	62° 50′	50° 41′	64	″	50	21.-6. ″	

No. of Station	N. Lat.	W. Long.	Depth in meters	Apparatus used	Length of wire (meters)	Date	Hour
502	South of northern Storö, north of Frederikshaab		265	Ringtrawl	100	2.-7. 1909	
519	Frederikshaab Harbour			"	(surface)	8.-7. "	
539	61° 23′	49° 11′	75	"	80—100	17.-7. "	
544	North of Julianehaab			"	100—125	21.-7. "	
583	North of Julianehaab			"	350	4.-8. "	
585	Julianehaab Fjord		195	"	300	" "	
624	Lichtenau Fjord			"	120	2.-9. "	
651	60° 35′	46° 21′	130	"	130	25.-9. "	10 a. m.
652	60° 05′	46° 35′	1347	"	110	" "	10 p. m.
653	"	"	"	"	35	" "	
654	59° 56′	46° 34′		"	120	26.-9. "	3 a. m.
655	59° 40′	46° 22′		"	110	" "	11³⁰ a. m.

Sarsia princeps Haeckel.

Codonium princeps Haeckel 1879, p. 13. Taf. I, figs. 1—2.
Sarsia — — — p. 655.

Of this species a great many large specimens have been captured. During the voyage out only some few specimens were found in Godthaab Fjord (Stat. 54, 15th of June 1908). During July and August 1908 it was taken at several stations in the Disco Bay, off the west coast of Disco and in Umanak Fjord; furthermore, during the passage home, at several stations near the coast from Egedesminde to Fiskenæs and at stat. 272 on the slope to the deep of the Davis Strait. — In 1909 only a few specimens were taken near Frederikshaab and Julianehaab on the southern part of the Greenland coast. — The most records given by Levinsen 1892 were from the Disco Bay and Umanak Fjord.

Accordingly *Sarsia princeps* is a real inhabitant of the coastal water of West Greenland, not occurring in the inflowing Atlantic water.

Further distribution: Spitzbergen, Barents Sea, Bering Sea (Bigelow 1913).

Stations: 54 (+) — 112 (rr) — 124 (c) — 133 (r) — 173 (cc) — *174 (+) — *179 a (c) — *197 a (rr) — *200 a (rr) — *221 (rr)

— *222 (rr) — *230 (+) — *231 — *236 (+) — *243 (c) — *272 (+) — 502 (rr) — 583 (rr).

Sarsia mirabilis L. Agassiz.

Sarsia mirabilis L. Agassiz 1849 vol. 4. p. 224. pl. 4, 5.
? — *tubulosa* Lesson 1843.

In 1908 only a few specimens were taken at stat. 105 b ("Store Hellefiskebanke" off Holstensborg). In July 1909 the species was found commonly near Frederikshaab and Julianehaab in South Greenland. — Levinsen (1892) notes it from the Davis Strait and from Frederikshaab.

It is an inhabitant of the Atlantic coast of North America, from where it spreads to the Davis Strait and the southern part of the Greenland coast. It is also found off the European Atlantic coasts, and Linko (1905) mentions it from the Barents Sea and the White Sea.

Stations: 105 b (rr) — 502 (+) — 519 (cc) — 539 (+) — 544 (rr).

Bougainvillia superciliaris L. Agassiz.

Hippocrene superciliaris L. Agassiz 1849. vol. 4. p. 250. pl. 1—3.
Bougainvillia — — 1862 vol. 4. pp. 289, 291. figs. 37—39. p. 344. pl. 27, figs. 1—7.

This medusa is very common in the whole West-Greenland coast area and on the banks from Julianehaab to Egedesminde (at the entrance to the Disco Bay). Levinsen mentions it from several places in this region and also from Godhavn at the south coast of Disco.

The species is widely distributed at both sides of the northern Atlantic and adjacent waters. Mentioned by Bigelow (1913) from the north-western Pacific.

Stations: 54 (r) — 83 a (cc) — *90 — 100 c (rr) — 105 b (cc) — *185 (+) — *188 (r) — *195 a (+) — *195 b (rr) — *196 a (c) — *197 a (r) — *200 a (c) — *201 a (cc) — *201 b — *203 (+) — *211 (+) — *218 (r) — *221 (+) — *222 (+) — *270 (+) — — 386 (r) — *388 (r) — 502 (c) — 519 (rr) — 544 (c).

Rathkea octopunctata (Sars).

Cytaeis octopunctata M. Sars 1835—1837—1846.
Hippocrene — Forbes 1841 p. 84.
Lizzia — — 1848 p. 64. pl. 12, fig 3.
Margellium octopunctatum Haeckel 1879 p. 95.
Rathkea octopunctata — — p. 97.
— — Levinsen 1892 p. 145.
Margellium octopunctatum Levinsen 1892 p. 145.
— *gratum* — — p. 145.
— *octopunctatum* Browne 1895 p. 270.
i. p. *Rathkea Blumenbachii* Hartlaub 1911 p. 229.

Levinsen notes this species from Egedesminde at the entrance to the Disco Bay (*Margellium octop.* and *Rathkea octop.*) and from Jakobshavn in the Disco Bay (*Margellium gratum*). The "Tjalfe" has taken it at one station only, but in great abundance near Frederikshaab in July 1909.

It is a widely distributed North Atlantic species. See the Addenda.

Station: 502 (cc).

Tiara pileata (Forskål).

Medusa pileata Forskål 1775 p. 110.
Oceania — Péron & Lesueur 1809 p. 345.
Tiara — Haeckel 1879 p. 58. taf. 3, figs. 6—8.

A few specimens were captured in August 1908 off the west coast of Disco, in July and August 1909 near Frederikshaab and Julianehaab.

A very eurytherm and euryhalin species, distributed throughout the whole North Atlantic, most common at the European side, penetrating into inland seas, such as the Baltic. Mediterranean. Recorded by Vanhöffen (1912) from the Pacific.

Stations: 179 (rr) — 519 (rr) — 583 (rr).

Tiara conifera Haeckel.

Tiara conifera Haeckel 1879 p. 59.

Levinsen records this species from Disco Bay and Holstensborg. The "Tjalfe" has taken some specimens near Frederikshaab.

Distributed throughout the Arctic area from Greenland to the Barents -Sea.

Station: 502 (+).

Catablema campanula Haeckel.

Catablema campanula Haeckel 1879 p. 59.

Found at several stations, abundant only at stat. 502 (Frederikshaab); also taken near Julianehaab and Godthaab and more sparingly northwards as far as 68° 49′ n. Lat. (Egedesminde).

Geographical distribution: Greenland, Spitzbergen, Barents Sea.

Stations: 54 (r) — 105 b (r) — 200 a (rr) — 221 (rr) — 502 (c) — 519 (r) — 544 (+) — 583 (r) — 585 (rr).

Catablema eurystoma Haeckel.

Catablema eurystoma Haeckel 1879 p. 64. taf. 4, figs. 6, 7.

Only taken in July and August 1909, at five stations near the coast off Frederikshaab and Julianehaab. — Levinsen records it among others from Umanak and from Ritenbenk in Disco Bay.

Geographical Distribution: Greenland, White Sea.

Stations: 502 (+) — 519 (rr) — 544 (r) — 583 (+) — 585 (rr).

Cytaeis sp.

Station 502 (r).

Thaumantias Eschscholtzii Haeckel.

Haeckel 1879 p. 129, taf. 8, fig. 4.

During the year 1908 only one single specimen of this species was captured, at stat. 221, south of Holstensborg, $^{28}/_{8}$. — In July 1909 it was taken in great abundance near Freederikshaab.

Distribution: Greenland.

Stations: 221 (rr) — 502 (+) — 519 (cc).

Thaumantias rubrum (Fewkes).

Chromatonema rubrum Fewkes 1882 p. 305. pl. I, fig. 41.
Thaumantias — Mayer 1910 p. 199.

From deep water 7 specimens were captured of this beautiful species. The gonads, the stomach and the tentacles are splendidly orange (the specimens are preserved in formaline); in some specimens the large eggs are seen in the gonads. The jelly is very thick, fully as thick as the depth of the bell cavity; there are 15—18 tentacles. The specimens in hand have the following sizes (as far as preserved medusæ can be measured):

diameter:	17	15	14	13	11	11	9 mm.
height:	14	13	13	11	10	10	8 mm.
number of tent.:	18		15	18		15	16

From the Atlantic ocean I have seen larger specimens of the same species.

Further distribution: Off the New England coast (Fewkes); probably widely distributed in North Atlantic depths.

Stations:

333	63° 18′ n. Lat.	54° 55′ w. Long.	depth 1300 m. 1530 m. wire.	3 specimens.
336	64° 06′ —	55° 18′ —	depth 1046—1100 m. 1200 m. wire.	4 specimens.

Melicertum campanula L. Agassiz.

L. Agassiz 1862 vol. 4. pp. 349, 352.
Haeckel 1879 p. 137.

A few specimens from Frederikshaab, stat. 502.

Distribution: American coast from Cape Cod northwards to South-Greenland. Murman coast.

Ptychogena lactea A. Agassiz.

Pthychogena lactea A. Agassiz 1865 p. 137. figs. 220—224.
— — Haeckel 1879 p. 147.
— *pinnulata* Haeckel 1879 p. 148.
— *lactea* Browne 1907 p. 473.

Levinsen records this species from Disco Bay. The "Tjalfe" has taken it, rather sparingly, during July and August 1908 in Umanak Fjord, Disco Bay, off Holstensborg, and in Godthaab Fjord.

In the specimen from Umanak Fjord one of the radial canals (with gonads) is bifurcate.

The species is distributed throughout the subarctic Atlantic and adjacent arctic waters. Bering Sea, Ochotian Sea, Japan (Bigelow 1913).

Stations: 125 (r) — 171 (rr) — *181 (+) — 211 (rr) — *234 (rr) — *235 (rr).

Staurophora arctica (Haeckel).

Staurostoma arctica Haeckel 1879, p. 131.
Staurophora — Browne 1907 p. 471.

A few specimens were captured between Holstensborg and Sukkertoppen. Levinsen records it from the Disco Bay.

An arctic species, occuring in the Arctic Ocean, at Spitzbergen, in the Barents Sea and off the west coast of Greenland. (See the Addenda).

Stations: 223 (rr) — *225 (rr).

Aglantha digitalis (O. Fr. Müller).

Medusa digitale O. Fr. Müller 1766 p. 243.
— — Fabricius 1780 p. 366.
Aglantha digitalis Haeckel 1879 p. 272. taf. 16, fig. 5, 6.

This medusa is very common along the whole of the west coast of Greenland. — Vanhöffen (1897) has given thorough information about its seasonal variation and the occurrence of the young. He states that young individuals without any trace of gonads are found during the whole year. The youngest stages were found in May and June in the deeper layers of the water. All specimens from October were 3—4 mm. The beginning of development of the gonads takes place in the spring (in a very few specimens as early as in January); the prolongation of the gonads begins occasionally in May; this means, I suppose, that the prolongation usually takes place about June, the maturation accordingly in the true summer months. Then it seems rather peculiar that the youngest stages are found in May and June, unless we suppose that Vanhöffen's „youngest stages" are the young of individuals, breeding earlier

Aglantha

	Date	Stat.	Place	Meter Wire used	Number of individuals	Size mm.
1908						
May	12	1 a	59° 25′ N. L. 22° 56′ W. L.	175	ca. 70	
	17	9	58° 33′ — 35° 55′ —	600	27	8—16
	26	13	58° 08′ — 39° 10′ —	40	33	8—17
	"	14	58° 08′ — 39° 12′ —	150	49	10—23
	"	15	58° 08′ — 39° 24′ —	500	59	8—20
June	8	33 b	63° 25′ — 54° 34′ —	70	20	17—22
	10	42	63° 55′ — 52° 21′ —	70	140	7—23
July	5	100 c	66° 44′ — 56° 08′ —	70	20	14—20
	7	105 b	67° 22′ — 56° 14′ —	0—100	12	14—29
	9	109 b	68° 34′ — 53° 45′ —	70	85	13—25
	16	124	69° 17′ — 52° 14′ —	150	ca. 60	9—22
August	6	173	70° 44′ — 52° 20′ —	150	2	15—15
	29	229	64° 20′ — 53° 03′ —	80—120	7	17—19
1909						
May	3	320	60° 07′ — 48° 26′ —	(surface)	7	10—21
	"	321	" — " —	600	60	till 23
June	7	423	65° 03′ — 54° 16′ —	80—100—120	28	8—21
July	2	502	S. of N. Storø, Frederikshaab	100	1	12
	21	544	N. of Julianehaab	100—125	2	10—25
August	4	583	N. of Julianehaab	350	1	18
September	25	652	60° 05′ N. L. 46° 35′ W. L.	110	250	4—16
	"	653	" — " —	35	ca. 100	4—14
	26	654	59° 56′ — 46° 34′ —	120	ca. 250	5—13

digitalis.

Average size mm.	Number of individuals with prolonged gonads	Average size of gonads	Gonads not yet visible	Individuals where state of gonads is not to be distinguished	Remarks
ca. 11	2	1,5		ca. 68	Badly preserved.
11,3	a few			nearly all	Badly preserved.
12,3	a few			nearly all	Badly preserved; probably both mature and immature specimens present.
16,0	nearly all				Gonads destroyed, cannot be measured.
12,4	15	1,9		44	Badly preserved; the specimens with well preserved gonads have the sizes 10—16 mm.
19,7	all				
ca. 14	the most		a few		In the small specimens gonads are not visible; most specimens of 10—12 mm. have gonads of 1—2 mm. In the larger the gonads are mostly destroyed.
16,2	all	3,9			
20,8	all	7,3			
20,1	all	6,0			
ca. 18	56	ca. 4,5	4		The immature specimens are ca. 10 mm. in size.
15	1	3		1	
18,3	all				Badly preserved.
16,4	6	2	1		
					Specimens of all sizes up to 23 mm., very badly preserved so that investigation of the gonads is impossible.
13,5	nearly all	2,8		a few	
12				1	
17,5	1	1			
18	1				
ca. 10	23	1,4	227		Well preserved.
ca. 9	4	2	ca. 96		One specimen of 14 mm. (gonads 4 mm.), the others 4—12 mm.
ca. 10	10	1,5	ca. 240		In some specimens the gonads are just visible as fine points; only in 10 specim. (9—13 mm.) they are somewhat prolonged.

than normally; we know that such cases may really happen, young individuals being found at every season of the year.

The species has been taken at almost all the pelagic stations of the "Tjalfe" Expedition, but only from comparatively few stations has the material been preserved. I have measured the preserved specimens and examined the stage of development of the gonads. The result will be seen in the synoptic table. -- It would be better to exclude the first five stations, which are from the Irminger Sea. — In June and, especially, in July we find the greater number to be large mature individuals. It is probable, therefore, that the breeding takes place mainly in July, the old individuals dying away afterwards. Then, in September we mainly find small specimens without any trace of gonads. The few specimens with gonads in the form of fine points or a little prolonged are, I suppose, the young of individuals breeding earlier than normally. — During the winter they only grow a little, though in May the average size is obviously larger, and the development of the gonads begins, the growth increasing largely at the same time.

The species has been found in almost all samples from the upper layers of the water. It seems to have been less common in 1909 than in 1908.

Stations:

May 1908: 1 a (+) — 9 (r) — 13 (r) — 14 (c) — 15 (c).

June 1908: 33 b (c) — 42 (c) — *71 (rr) — *73 (c) — *79 a (r) — *81 a (rr).

July 1908: 100 c (c) — 105 b (+) — 109 b (cc) — *112 (cc) — *113 b (c) — 124 (c) — *126 b (c) — *133 (+) — *158 (rr) — *160 (c).

August 1908: *171 (+) — 173 (cc) — *174 (cc) — *178 (rr) — 179 a (cc) — *181 (+) — *185 (r) — *195 a (+) — *195 b (c) — *196 c (c) — *197 a (cc) — *197 b (rr) — *200 a (c) — *201 a (+) — *201 b — *203 — *204 (+) — *205 (+) — *207 (cc) — *208 (c) — *218 (c) — *219 — *220 (cc) — *221 (r) — *222 +) --- *223 (+) — *224 (+) — *225 (cc) — *227 (r) — *228 (+)

— 229 (r) — *230 (r) — *231 — *233 (+) — *234 — *235 — *236 (+).

September 1908: *241 (cc) — *242 (c) — *243 (+) — *244 (c) — *270 (r) — *274 (c).

October 1908: *296 (+) — *298 (+) — *299 (+).

April 1909: *304 (rr) — *305 (rr) — *314 (rr) — *315 (r).

May 1909: 320 (r) — 321 (r) — *325 (r) — *326 (+) — *327 (+) — *330 (+) — *331 (c) — *332 (+) — *334 (+) — *352 (+).

June 1909: *401 (rr) — *405 — *411 (c) — *412 (c) — *413 (+) — *415 (c) — *416 (rr) — *417 (r) — *418 (rr) — 423 (c) — *424 (cc) — *425 (+) — *426 (r) — *427 (r) — *430 (+) — *432 (+) — *433 (cc) — *435 (c) — *439 (rr) — *466 (rr).

July 1909: 502 (rr) — *539 — 544 (rr).

August 1909: 583 (rr).

September 1909: *624 (rr) — *651 (+) — 652 (cc) — 653 (+) — 654 (cc) — *655 (cc).

Aglantha rufobrunnea n. sp.

Figs. 1—2.

Hemispherical; diameter ca. 1—1,5 cm. The walls of the bell are fairly thin, their greatest thickness being about 1,5 mm. No apical projection, or a slight trace of it. The manubrium is rather short, pyriform, four-edged in section. Only a trace of a stomachal peduncle. 4 short lips. 8 radial canals, comparatively broad, ribbon-shaped in the same manner as in *Aglantha digitalis*, straight and entire. 8 gonads, sausage-shaped, fastened near the base of the manubrium and

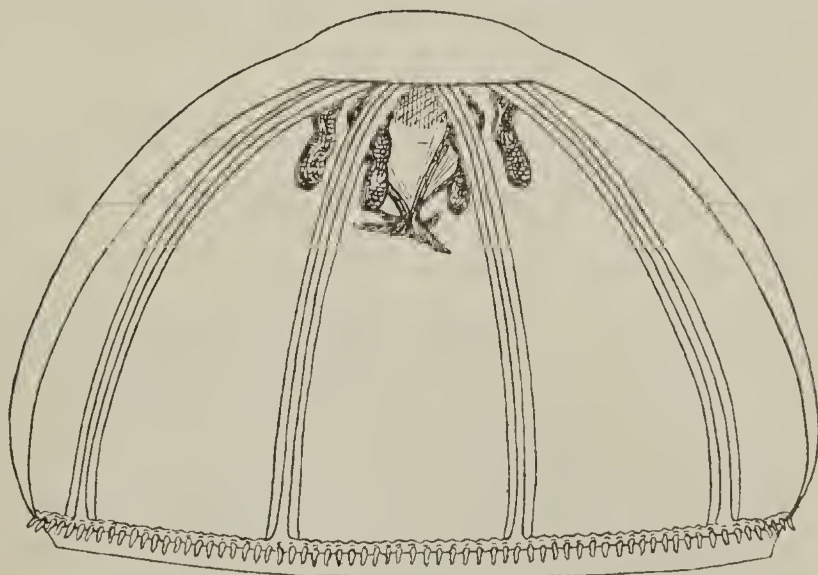


Fig. 1.

hanging downwards into the bell cavity. The muscular tissue is weak. A great number of short tentacles (about 160). I have not been able to find the sense organs. — Velum is comparatively broad, but thin and with weak muscles; the velum is whole only in the best preserved specimen, in the other specimens it is torn or quite lost. — The colour is deep reddish brown. The distal part of the manubrium is in all the specimens white with four red edges; the lips are red.

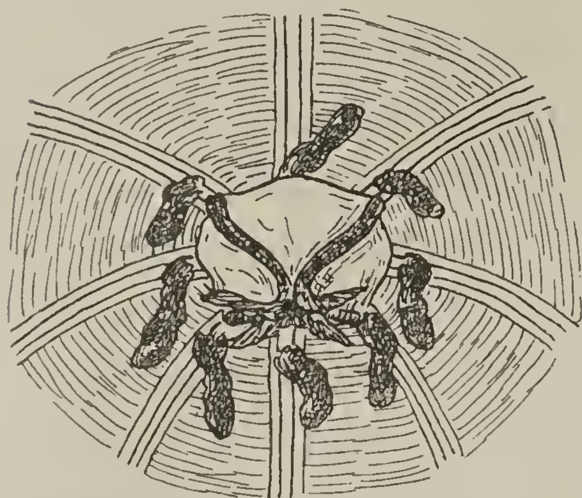


Fig. 2.

This pretty medusa, of which 6 specimens are to hand from deep water, belongs undoubtedly to the genus *Aglantha*. It reminds one of Maas's "*Melicertum*" *proboscifer* (Maas 1897). It differs from this tropical Pacific species, in that it lacks a well developed stomachal peduncle, that there are only 4 lips, and that the gonads are fastened closely by the manubrium (see fig. 2). In the Pacific species the gonads arise from the middle of the radial canals.

It is certain that the two forms are closely related and I have no doubt, that both of them have to be referred to the genus *Aglantha*.

6 specimens from Stat. 333. — 7-V-1909. — 63° 18′ N. Lat., 54° 55′ W. Long. — Ringtrawl with 1530 m. Wire.

Pantachogon rubrum Vanhöffen.

P. rubrum Vanhöffen 1902 b p. 63 Taf. IX, Fig. 9; Taf. X Fig. 19 & 20; Taf. XI, Fig. 25.
» — Maas 1905 p. 55. Taf. X, Fig. 66.
? *P. Haeckelii* Maas 1893 p. 17. Taf. I, Fig. 2.
? » — — 1904 p. 29.
? » — — 1906 p. 490.

The height of the bell is nearly as great as the diameter, ca. 12 mm: Manubrium short; the mouth with 4 lips. 8 radial

canals, very narrow. 8 gonads, along the canals, in younger individuals, linear, in mature specimens folded; the gonads begin somewhat below the base of the manubrium and reach nearly to the bell margin (comp. Vanhöffen 1902 b Taf. X, fig. 20 and p. 64). The tentacles are short, ca. 64 in number, all of the same shape and size. The number of sense organs cannot be determined exactly, it seems to be fairly large. Velum is very large, often ca. 3 mm. broad. — The preserved specimens are colourless or faintly reddish, very iridescent, but in the journals of the "Tjalfe" Expedition this species is noted as "the medusa with the red spot", that means that at least the eight-angular base of the manubrium has been red in the living specimens; moreover, Maas states, that in the specimens of the "Siboga" Expedition the red colour was frequently only indicated. In fact, I have not the slightest doubt but that "the medusa with the red spot" from the Davis Strait belongs really to *Pantachogon rubrum* Vanhöffen.

A. G. Mayer (1910) is inclined to suppose, that this species is identical with *P. Haeckelii* Maas, because, setting aside the colour, no deciding difference seems to be present. Maas, on the other hand, having examined both species, maintains, that they are not identical; probably it will be impossible to give any decided answer to the question, while only two specimens have been captured of *P. Haeckelii.*

Pantachogon rubrum Vanhöffen was found by the "Valdivia" Expedition in the great depth of the Guinea region from about 14° N. Lat. towards Congo; it was wanting round South Africa, but was found again abundantly south of Africa from 55° 27′ S. Lat. to 64° 14′ S. Lat., the southernmost station of the expedition. It was also taken in the tropical Indian Ocean by the same expedition. Maas found it again in the material of the "Siboga" Expedition from the Indian Ocean and the Malayan Archipelago. (See Addenda).

The description of *Pantachogon Haeckelii* Maas (1893) was based on one single specimen, caught by the "Plankton-Expedition" in the Irminger Sea, about 60° N. Lat. Later Maas has found

another specimen, from 600 meters depth near Spitzbergen in the material from the cruise of the Prince de Monaco.

About the zoogeographical interest of the species, see page 259.

Stations: 322 (rr) — 333 (+) 336 (cc) — *338 — *344 — *345 — 348 (cc) — *363 (+) — *434 (c).

Aeginura Grimaldii Maas.

Aeginura Grimaldii Maas 1904 p. 38. Pl. III, fig. 19—28.
— *Weberi* Maas 1905 p. 77. Taf. XI, Fig. 73. Taf. XII, Fig. 76, Taf. XIV, Fig. 90—99.
Cunoctona Grimaldi var. *munda* Vanhöffen 1908 p. 53. Taf. II, Fig. 6.
— *guinensis* Vanhöffen 1908 p. 53. Taf. III, Fig. 29.
— *obscura* — — p. 53, Taf. II, Fig. 7. Taf. III, Fig. 25—28 & 30.
Aeginura Grimaldii Bigelow 1909, p. 80. Pl. 9. Fig. 4.
— — Mayer 1910. p. 470.

Three secondary marginal tentacles and six sense organs in each octant. The subumbrella, the stomach and the stomachal pouches, and the tentacles are deeply reddish brown; in some specimens a number of large white eggs are present.

Bigelow (1909) as well as Mayer (1910) suspect that *Aeginura Weberi* Maas is identical with *A. Grimaldii* Maas. In 1908 Vanhöffen described two new species of the genus: *guinensis* with 5 secondary tentacles, and *obscura* with 4 secondary tentacles in each octant; I do not think this character nor the comparatively slight variation in colour is sufficient for describing new species; I am sure, in consequence, that the two species cannot be maintained.

Aeginura Grimaldii, then, has a very wide distribution. Maas described the species from the North Atlantic, 47° 43′ N. Lat., 17° 10′ W. Long. Later he described it as *A. Weberi* (Maas 1905) from the Malayan Archipelago. The "Valdivia" Expedition (Vanhöffen 1908) found *Aeginura (Cunoctona) Grimaldii* var. *munda* and *A. guinensis* off the tropical coast of West Africa (the Guinea region), from great depths, and *A. obscura* in the depths off the German East Africa. Bigelow (1909) records *A. Grimaldii* from the eastern tropical Pacific. — All the records are from deep

water. — Accordingly the species has a world-wide distribution in the Oceanic depths. — Recently it has been recorded from Bering Sea and Japan (Bigelow 1913).

Stations: 322 (r) — 333 (rr) — 336 (rr) — *338.

Lucernaria quadricornis O. F. Müller.

One specimen from station 422, depth 83 m.

Periphylla hyacinthina Steenstrup.

Steenstrup 1837.
Haeckel 1879 p. 419. taf. 24, figs. 11—16.
Vanhöffen 1902 a p. 23.
Maas 1904 p. 47, pl. 5, fig. 35, pl. 6, figs. 45—46.
— 1906 pp. 502, 511.
Bigelow 1909 p. 26, pl. 1 & 9.

This magnificent species occurs commonly in the deep water (sparingly in the upper strata) in the Irminger Sea and the Davis Strait, northwards as far as the submarine ridge from the west coast of Greenland to Baffins Land. It was caught by the "Tjalfe" Expedition at 25 stations. Only five specimens were taken in the upper layers of the water (0—200 m. Wire, Stat. 1 a, 6, 35 a, 272 and 314); with these exceptions the species has only been taken with more than 500 m. Wire, and it was found in all the hauls with 1000—2000 m. Wire. — Specimens of all sizes were found; two specimens (stat. 1 a and 9) are said to have been about 50 cm. in diameter; unfortunately they could not be preserved; several large and medium-sized specimens are to hand, and a great many small ones. Small individuals are found at every season, at every place in the area, and in every depth, though they occur most numerously in the great depths, as will be seen from the table.

Periphylla hyacinthina is an inhabitant of the great oceanic depths, but some authors have noted, that the species may be found now and then nearer the surface in the colder areas of the ocean. It has a wide distribution, being found at Spitzbergen, commonly occurring in the Irminger Sea and the Davis Strait,

taken at several localities in the northern Atlantic, also in the Bay of Biscay and at the Azores; the "Valdivia" Expedition found it off the tropical coast of West Africa in the region of the Guinea current and in the tropical part of the Indian Ocean. — Recently recorded by Bigelow (1913) from the northern and north-western Pacific.

Stat.	Place N. Lat.	W. Long.	meter Wire	1908	
*1 a	59° 25′	22° 56′	175	May	1 very large specimen.
*6	58° 24′	34° 53′	0	"	1 young specimen.
*9	58° 33′	35° 53′	600	"	1 very large, some small specimens.
15	58° 08′	39° 24′	500	"	1 medium-sized, some small specimens.
*285	57° 51′	43° 58′	1000	September	2 young specimens.
*272	62° 21′	51° 52′	200	"	1 small specimen.
30 a	63° 04′	56° 32′	500	June	3 small specimens.
*35 a	63° 40′	52° 42′	30	"	1 medium sized specim.
76	63° 49′	53° 27′	1000	"	many small specimens.
*74	63° 53′	53° 18′	500	"	1 large, some small specimens.
*100 d	66° 44′	56° 08′	near bottom 330 m.	July	1 large specimen.
				1909	
*314	59° 13′	48° 46′	80	April	1 young specimen.
*316	58° 59′	50°48′	500	May	1 large, some small specimens.
321	60° 07′	48° 26′	600	"	a few specimens.
*322	"	"	2000	"	3 young specimens.
*434	62° 53′	54° 15′	1500—1200	June	1 large, some small specimens.
*436	63° 16′	52° 21′	near bottom 644 m.	"	4 large specimens.
*333	63° 18′	54° 25′	1530	May	several small specimens.
*336	64° 06′	55° 18′	1200	"	several small specimens.
*344	64° 22′	55° 48′	1200	"	a few specimens.
*345	64° 22′	55° 51′	1000	"	some small specimens.
*346	64° 22′	56° 00′	400—800	"	Several small specimens.
*348	64° 35′	56° 18′	900	"	1 medium-sized, several small specimens.
*363	66° 21′	57° 04′	800	"	1 large, several small specimens.
*373	66° 45′	56° 31′	750	"	4 large, several small specimens.

Bathymetrical occurrence of *Periphylla hyacinthina.*

Stat.	meter Wire	large	medium-sized	young
*6	0		1	
*35 a	30		1	
*314	80			1
*1 a	175	1		
*272	200			1
*100 d	(near bottom 330 m.)	1		
15	500		1	+
30 a	„			3
*74	„	1		+
*316	„	1		+
*9	600	1		+
321	„			
*373	750	4		c
*346	400—800			c
*436	(near bottom 644 m.)	4		
*363	800	1		c
*348	900		1	c
76	1000			cc
*285	„			2
*345	„			+
*336	1200			c
*344	„			
*434	1200—1500	1		+
*333	1530			c
*322	2000		1	2

Atolla Bairdi Fewkes.

Atolla Bairdi Fewkes 1886. p. 936, pl. 1—3.
— — Vanhöffen, 1902 a p. 9.
— — — 1906, p. 44, Fig.
— — Maas 1904 p. 49. pl. 4, figs. 29—34. pl. 5, figs. 38—43.

Of this splendid medusa several pretty specimens have been caught in deep water hauls in the Davis Strait. The specimens from Stat. 436 were taken with the trawl, fishing near the bottom but not touching, at 644 meters depth. The specimens from Stat. 348, 434 and some from 333 were dead. Moreover a fairly large specimen has been taken out of the stomach of a shark, *Centroscyllium Fabricii* Reinhardt, captured at Stat. 429, 8-VI-1909, 63° 54′ N. Lat., 53° 15′ W. Long., 980—1390 m.

Atolla Bairdi is an Atlantic deep sea medusa, distributed throughout the North Atlantic and taken by the "Valdivia" (Vanhöffen 1902 a) in the region of the Guinea current, 0° 25′ N. Lat. — 3° 55′ N. Lat. and 0° 31′ E. Long. — 7° 48′ E. Long. It has mostly been captured at considerable depths; very rarely it has been found in the upper layers of the water.

Stations:

	N. Lat.	W. Long.	m. Wire	
322	60° 07′	48° 26′	2000	r
333	63° 18′	54° 55′	1530	+
336	64° 06′	55° 18′	1200	rr
*338	64° 01′	55° 30′	1400—1500	
*344	64° 22′	55° 48′	1200	rr
*345	64° 22′	55° 51′	1000	rr
348	64° 35′	56° 18′	900	r
*434	62° 53′	54° 15′	1500—1200	r
436	63° 16′	52° 21′	(near bottom)	rr

Aurelia flavidula Péron & Lesueur.

Figs. 3—4.

Medusa aurita Fabricius 1780 p. 363.
Aurellia flavidula Péron og Lesueur 1809 p. 359.
Aurelia flavidula Lesson 1843 p. 376.
— — Levinsen 1892 p. 148.
? — *limbata* Vanhöffen 1906 p. 61.
non — — Brandt 1835 p. 372 Taf. X.

The Greenlandic form of *Aurelia* differs in certain respects from the typical American *Aurelia flavidula*.

The oral arms are nearly as long as the radius of the disc;

they are somewhat broader (and longer) than in *A. aurita*, but they are not lobed proximally as in the typical *A. flavidula*; this possibly may be owing to the fact that the preserved specimens are not completely grown (the largest ones are ca. 9 cm. in diameter). — The gonadial radius is ca. $^{2}/_{5}$—$^{1}/_{2}$ of the radius of the disc. The incisions of the disc-margin as in *A. aurita* and *flavidula*. — The canals are comparatively broad; they run somewhat sinuously and rather frequently they send out short blind branches. The branches of the canals anastomose exceedingly often; towards the disc-margin, in consequence, there are a great many short meshes, more than

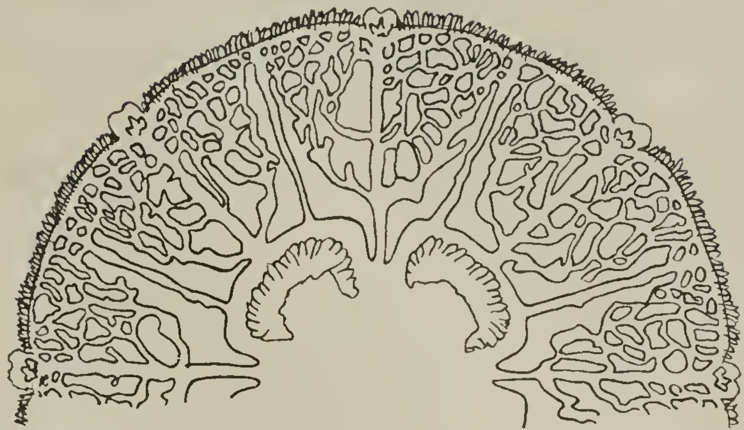


Fig. 3.



Fig. 4.

in the case of the typical *A. flavidula*. In *A. aurita*, as known, the branches are few and narrow and do not anastomose or rarely do so. In this regard the Greenlandic form has some likeness with *A. limbata* Brandt, but there is no trace of secondary incisions in

the disc-margin, and the disc is flattened, while *A. limbata* is nearly hemispherical (see Addenda).

The perradial canals are branched trichotomically as in *A. aurita* and *flavidula*, the main-canal sending out near its base two branches, which also divide; but in *A. aurita* and *flavidula typ.* the main-canal does not branch further on; on the other hand, in the specimens from the "Tjalfe" the perradial main-canal sends out numerous branches to both sides, repeatedly anastomosing with the other branches (see the figures). — In *A. aurita*, usually 3 canals issue from every genital sinus; two adradial unbranched and one interradial trichotomically branched in the same manner as the perradial canals, viz. two side-branches, branching further on, and a main stem, usually unbranched; rarely there is one pair of eradial slightly branched canals also. — In the typical *A. flavidula* 7, seldom 5 canals issue from the genital sinus, viz. 2 adradial unbranched, 1 interradial unbranched, 4 (2) eradial branched, two on each side of the interradial canal, between this and the adradial canals. However, the number of eradial canals is of less importance, because in younger stages of development the eradial canals are seen to be sidebranches on the interradial main-canal. — In the large specimens from the "Tjalfe" (see fig. 4) 5 canals issue from the genital sinus: two adradial, unbranched except in their distal part, where they anastomose with the branches of the other canals; one interradial, trichotomically branched in the same manner as the perradial canals, the main-stem, accordingly, with many side-branches; finally two eradial branched canals, one on each side of the interradial canal. In younger specimens (fig. 3) these two canals issue as side branches from the base of the interradial stem, the same character which is permanent in *A. aurita*.

The colour of the living animal is yellow or brownish yellow; the preserved specimens are perfectly colourless.

It will be seen that the characteristics of the Greenlandic form of *Aurelia* refer to *A. flavidula* as the nearest related form, though the Greenlandic form seems to be further developed in regard to the mode of branching of the canal system.

Vanhöffen (1906) notes *A. limbata* from Greenland; I am inclined to think, this was owing to a confusion because of the superficial likeness between this form and the Greenlandic *A. flavidula* in regard to the colour and the mode of branching of the canals.

In the material from the "Tjalfe" I have found two small 6-radiate specimens.

Stations: *181 (rr) — 200 a (rr) — 203 (cc) — *221 (rr) — *233 (+) — *234 — *235 — *236 (+) — *243 (rr) — 377 (c) — 386 (cc) — 502 (r) — 519 (rr).

Cyanea arctica Péron & Lesueur.

Cyanea arctica Péron & Lesueur 1809 p. 363.
— — L. Agassiz 1862. pp. 87, 162.
— — Levinsen 1892 p. 148.
— — Vanhöffen 1906 p. 53.
in parte *Cyanea capillata* Mayer 1910 III, p. 596.
? — — Eschscholtz 1829 p. 68.

In the material of the expedition five specimens of *Cyanea* are preserved; they have the following diameters: 1—1,5—2—4—11 cm. The two largest specimens agree fairly well with *Cyanea arctica* Pér. & Les.; the 16 marginal lobes are somewhat longer than usual in *C. arctica*, but not as long as in *C. capillata*, and are very slightly scalloped as in *C. arctica*. The three small specimens lack the pointed aboral papillæ, characteristic for the young *C. arctica*; these papillæ are said to be the most characteristic difference of *C. arctica* Pér. & Les. from *C. capillata* Eschsch. The present specimens, on the other hand, have many quite small warty papillæ on the marginal lobes but none on the central disc; they are most numerous in the smallest specimen. — It is relevant to all the specimens that proportionate to the size the tentacles are more numerous than in the typical *C. arctica*; furthermore, in the three smallest specimens the middle tentacle in each bundle is much larger than the others.

Stations: 203 (rr) — 236 (rr) — *270 (rr) — *377 (c) — *386 (cc) — 502 (rr) — *585 (+).

Addenda.

After the above was printed I have received Bigelow's paper: Medusae and Siphonophorae collected by the U. S. Fisheries Steamer "Albatross" in the Northwestern Pacific, 1906 (Proceed. U. S. Nat. Mus. Vol. 44, 1913).

In this paper Bigelow mentions some species, also mentioned in the present paper, and not previously known from the area in question. The new localities have been added in the above (marked Bigelow 1913), but the following species need further remarks, which could not be inserted in the proof-sheet.

Rathkea octopunctata (Sars) is supposed to be identical with *R. Blumenbachii* (Rathke); some specimens were found in the Bering Sea.

Browne (1907) and Mayer (1910) have pointed out, that it would be very desirable to obtain a comparison between Atlantic and Pacific specimens of *Staurophora.* Bigelow has been able to make such comparisons, and he states, that the Atlantic species *S. arctica* (Häeckel) and *laciniata* Agassiz are identical with the Pacific *S. Mertensii* Brandt.

Aglantha rosea (Forbes) is considered to be identical with *A. digitalis* (O. Fr. Müller); the species is very common in the northwestern Pacific.

From deep-water hauls a great many specimens have been obtained of a *Pantachogon*, recorded as *P. Haeckelii* Maas; the thorough description and the figures agree exactly with the Greenlandic specimens described above as *P. rubrum* Vanhöffen and there can be no doubt, that they belong to the same species. It is a very interesting fact, that this species, previously known from tropical and antarctic deeps only, has now been detected in northern regions both in the Atlantic and in the Pacific area. From Bigelow's description it seems very possible, that *P. rubrum* is identical with *P. Haeckelii*, but the question seems to me still to be open.

Bigelow describes and figures an *Aurelia* referred to *A. limbata* Brandt, which seems to have a great likeness to the above

described Greenlandic *Aurelia,* in regard to the canal system and the form of the margin of the disc; but in the Pacific specimens the "velarium, margin, and lappets are heavily pigmented", while in the specimens from Greenland no pigment is observed; the yellow colour of the living animal has wholly disappeared; moreover the mouth-arms of one of the Pacific specimens are said to be, "slightly longer than the bell radius", while in the Greenlandic specimens they do not reach the margin of the disc. I can scarcely believe, that the *Aurelia* from Greenland belongs to *limbata* Brandt (see above, p. 282); whether it is identical with the *Aurelia,* described by Bigelow as *A. limbata,* I do not know.

Literature.

1865. Agassiz, A.: North-American Acalephae. — Ill. Catal. Mus. Comp. Zool. Cambridge, Mass.

1849. Agassiz, L.: Contrib. Nat. History of the Acalephæ of N. America. Part I. — Mem. Amer. Acad. of Arts and Sciences, New Ser. Vol. IV.

1860—1862. —: Contrib. Nat. Hist. of the United States of America. Vol. III. 1860, Vol. IV. 1862.

1909. Bigelow: The Medusae. — Mem. Mus. Comp. Zoöl., Harvard College. Vol. XXXVII.

1835. Brandt: Schirmquallen.

1895. Browne: Report on the Medusæ of the L. M. B. C. District. — Proceed. and Transact. Liverpool Biol. Soc. Vol. IX.

1907. —: A Revision of the Medusæ belonging to the Family Laodiceidæ. Ann. Mag. Nat. Hist. Ser. 7. Vol. XX.

1829. Eschscholtz: System der Acalephen.

1780. Fabricius: Fauna groenlandica.

1882. Fewkes: On the Acalephae of the East Coast of New England. — Bull. Mus. Comp. Zoöl., Harvard College. vol. 9. No. 8.

1886. —: Report on the Medusæ collected in the Gulf Stream by the Albatross 1883—84 — U. S. Fish Comm. XII. Washington.

1841. Forbes: Contributions to Brit. Actinology. — Ann. Mag. Nat. Hist. Ser. 1. Vol. VII.

1848. —: A Monograph of the british naked-eyed Medusae. Ray Soc. London.

1775. Forskål: Descriptiones animalium quae in itinere orientali observavit. — Hauniae.

1879. Haeckel: System der Medusen.

1911. Hartlaub: Craspedote Medusen. Fam. III. Margelidae. — Nordisches Plankton, No. XII. — Lief. 15.

1843. Lesson: Histoire naturelle des Zoophytes Acalèphes.

1892. Levinsen: Meduser, Ctenophorer og Hydroider fra Grønlands Vestkyst. — Vidensk. Meddel. Naturhist. Foren. København. 1892.

1905. Linko: Zoologische Studien im Barents-Meere. — Zoologischer Anzeiger 28. Bd.

1893. Maas: Die craspedoten Medusen der Plankton-Expedition. — Ergebn. der Plankton-Exped. Bd. II. K. c. — Kiel und Leipzig.

1897. —: Die Medusen. — Memoirs Museum Comp. Zoöl., Harvard College. Vol. XXIII. No. 1.

1904. —: Méduses. — Results des Campagnes scientifiques..... Prince de Monaco. — Fascicule XXVIII.

1905. —: Die craspedoten Medusen der Siboga-Expedition. — Siboga-Expeditie, Monogr. X. — Leiden.

1906. —: Die arktischen Medusen (ausschliesslich der Polypomedusen). — Fauna arctica, Bd. IV. Lief. III.

1910. Mayer: Medusae of the World, I—II—III.

1766. Müller O. Fr.: Prodromus.

1809. Péron & Lesueur: Tableau des caractères génériques et specifiques de toutes les espèces de Méduses connues jusqu'à ce jour. — Annales du Mus. d'Histoire Naturelle t. 14.

1835. Sars, M.: Beskrivelser og Iagttagelser over nogle..... ved den Bergenske Kyst levende Dyr..... Bergen.

1846. —: Ueber die Fortpflanzungsweise einiger Polypen. — Fauna littoralis Norvegiae. 1. Heft. Christiania.

1837. Steenstrup: Acta Mus. Hafniensis.

1897. Vanhöffen: Die Fauna und Flora Grönlands. — Grönland-Exped. der Gesellsch. für Erdkunde zu Berlin 1891—1893. Unter Leitung von E. v. Drygalski. II. Bd. Berlin. 1897.

1902 a. —: Die acraspeden Medusen der deutschen Tiefsee-Expedition 1898—1899. — Wissensch. Ergebn. Deutsche Tiefsee-Exped. Bd. III.

1902 b. —: Die craspedoten Medusen der deutschen Tiefsee-Expedition. ibid. Bd. III.

1906. —: Acraspede Medusen. — Nordisches Plankton No. XI. — Lief. V.

1908. —: Die Narcomedusen. — Wiss. Ergebn. Deutsche Tiefsee-Exped. Bd. XIX. Heft 2.

1912. —: Die craspedoten Medusen des "Vettor Pisani". — Zoologica, Heft 67. Stuttgart.

16.—8.—1913.

Tapes senescens Doederlein og *Tapes aureus* Gm. var. *eemiensis* Nordm.

Af

V. Nordmann.

(Med Tavle V—VI.)

(With an English Summary.)

I Vinteren 1899—1900 blev der paa den saakaldte Slotsbanke straks Sydvest for Tønder i Slesvig foretaget to Boringer, ved hvilke der i en Dybde af henholdsvis 14,8 og 18,8 m. under Jordoverfladen (12,0 og 15,4 m. u. Havet) blev truffet marint, fossilførende Ler, der kunde følges til en Dybde af henholdsvis 24,4 og 28,5 m. under Overfladen. Leret var dækket af fluvioglacialt Sand og Alluvium og hvilede paa vekslende Lag af fluvioglacialt Sand og Moræneler. Paa Grund af den anvendte Methode plejer de Fossiler, som kommer for Dagens Lys ved den Slags Boringer, at være temmelig stærkt medtagne og sønderslaaede, hvad der i høj Grad vanskeliggør Bestemmelsen, men ved de ovenomtalte Boringer hændte det, at en Del Materiale fra et særlig rigt Skallag blev bragt frem i temmelig uskadt Stand. Saavel Lejringsforholdene som Faunaen blev beskrevne af Poul Harder[1]). Ved Bearbejdelsen var jeg ham behjælpelig med Bestemmelsen af de vanskeligere og sjældnere forekommende Mollusker, og blandt disse blev min Opmærksomhed i høj Grad tiltrukket af en *Tapes*-Art, der i Form ganske lignede *Tapes aureus* Gm., men overgik den betydeligt i

---

[1]) Harder, P. 1910: En ny sønderjysk lokalitet for marint diluvium. Meddel. Dansk geol. Foren. Kbhvn. Bd. I, Nr. 6.

Størrelse og tildels i Skallernes Tykkelse. Den blev derfor i Harders Publication omtalt som en stor Form af *Tapes aureus*. I Materialet fandtes den repræsenteret ved talrige Fragmenter og 5 hele Skaller, af hvilke den største er 58 mm. lang og 42 mm. høj.

I den følgende Sommer fandt Harder et Fragment af denne Art i „Cyprinaler“ paa Drejø, og ved mine Undersøgelser over visse interglaciale marine Dannelser i det sydlige Danmark, Nordtyskland og Holland[1]) viste det sig, at denne Art er saa hyppig i disse Aflejringer, at den med Rette bør betegnes som deres Ledefossil. Paa Grund af disse Aflejringers karakteristiske og ensartede Fauna sammenfattede jeg dem under Fællesnavnet „Eem-Aflejringerne“[2]) og beskrev den store *Tapes* — der fandtes at være kendt fra Westpreussen og Holland under Navnet *Tapes virgineus* — som *Tapes aureus* Gm. var. *eemiensis* n. v., idet jeg stadig ikke fandt tilstrækkelig Grund til at udskille den som en særlig Art. Følgende Diagnose opstilledes: testa ovata, tumida, plus minusve oblonga, postice sat producta, umbonibus altis et sat curvatis. Valvulæ solidæ, crassæ, concentrice sulcatæ, sulcis partis tertiæ vel quartæ postremæ undulatis, striis radiantibus, plus minusve distinctis. Yderligere fremhævedes det for denne Varietet (eller Art?) karakteristisk skulpterede Felt af større eller mindre Udstrækning paa den bageste Del af Skallen.

Under en Studierejse, som jeg med Understøttelse af Carlsbergfondet foretog til England i 1909 for at studere Cragdannelserne, havde jeg særlig Opmærksomheden henvendt paa den omtalte *Tapes*, men fandt intet Spor af den i Cragdannelsernes Fauna. Derimod saa jeg saavel i „British Museum“ som i „Museum for Practical Geology“, London, blandt Fossiler fra de til Pliocen henførte, vel-

---

[1]) Nordmann, V. 1908: Molluskfaunaen i Cyprinaleret og Mellemevropas andre Eem-Aflejringer. Delvis Særtryk af Victor Madsen, V. Nordmann og N. Hartz, 1908: Eem-Zonerne. Danm. geol. Undersøgelser. II. R. Nr. 17. Avec résumé en français.

[3]) Opkaldt efter den lille hollandske Flod Eem, der gennemstrømmer den Syd for Zuidersøen liggende Gelderdal, i hvilken disse Aflejringer er paaviste ved talrige Boringer.

kendte Aflejringer fra St. Erth i Cornwall adskillige Fragmenter af en *Tapes* (bestemt som *T. virgineus*), der maaske burde henføres til *T. aureus* var. *eemiensis.* Imidlertid er Materialet saa daarligt bevaret, at jeg ikke fuldtud drister mig til en saadan Bestemmelse. Derimod stiftede jeg under mit Ophold i England Bekendskab med S. Cerulli-Irelli's store, endnu (1913) ikke afsluttede Værk: Fauna malacologica mariana (en Monografi af den marine Molluskfauna i de klassiske, fossilrige Lag i Monte Mario ved Rom) og fandt deri en Beskrivelse og Afbildning af *Tapes senescens* Doederl., der syntes mig at passe godt paa *T. aureus* var. *eemiensis.* Med Carlsbergfondets Understøttelse blev jeg i Stand til i Rom nøjere at studere denne Art og dens Forekomst, og jeg skal her gøre Rede for disse Undersøgelsers Resultat.

Tapes senescens Doederl. er først bleven beskrevet af Cocconi[1]) paa følgende Maade: *T. senescens* Dod. (Denom. ined. del Mus. di Stor. Nat. di Parma). (Tav. IX, fig. 1, 2). T. Testa transversa, cuneata, valde inæquilatera, crassa, lineis radiantibus longitudinalibus, creberrimis, undulatis, striisque incrementalibus decussata; antice rotundata, posterius longe producta, subangulata, lunula cordata impressa; sinu palleali abbreviato rotundata; disco incrassato; dentibus cardinalibus tribus divaricatis, lamelliformibus, posticis bifides. Han siger fremdeles, at han har fundet denne Art blandt Molluskerne i Parmas Museum, hvor den henlaa forsynet med Navn af Prof. Doederlein; da han ikke kan finde, at den ellers har været beskrevet eller afbildet, saa har han nu givet den ovenstaaende Diagnose efter de Karakterer, som Skallen synes ham at frembyde. Derefter omtaler han den Forskel, der hersker mellem denne Art og *Tapes Basteroti* Mayer, med hvilken den ellers har en vis Lighed. Cocconi ledsager sin Beskrivelse med en Tegning, der dog nærmest maa siges at være saa uheldig, at en Bestemmelse ikke kan foretages efter den alene.

---

[1]) Cocconi, Girolamo. 1873: Enumerazione sistematica dei molluschi miocenici e pliocenici delle provincie di Parma e di Piacenza. Memorie dell' Accademia delle Scienze dell' Istituto di Bologna. Serie III, Tome III, Fasc. 3. p. 695—96.

Cerulli-Irelli[1]) omtaler dens Udseende paa følgende Maade: Omkredsen varierer paa Grund af Bagendens større eller mindre Forlængelse og derved, at Dorsalranden er mere eller mindre stærkt vinkelbøjet i Nærheden af det bageste Muskelindtryk. Meget forskellig er ogsaa Muslingens Convexitet, der undertiden er særlig fremtrædende i Skallens centrale Del. Hvirvlen er mere eller mindre indrullet og fremragende, men altid stærkt fremadbøjet. Ydersidens concentriske Striering præsenterer sig mere eller mindre regelmæssig ved Tilvækstfurernes større eller mindre Tydelighed og Dybde, men den er altid mere tydelig og regelmæssig paa Skallens forreste Del, næsten udvisket paa Skallens midterste Del og uregelmæssig og rynket („rugosa") paa den bageste Del. De særdeles fine, undulerende Længdestriber er derimod normalt mere tydelige paa den centrale Del og har Udseende af et Straaleknippe, der udstraaler fra Hvirvlen. Kappebugten er kort, afrundet i Spidsen; Muskelindtrykkene — særlig det forreste — dybe.

Fra Hovedtypen (Cocconis Figur) adskiller Cerulli-Irelli følgende Varieteter:

1) Var. *rotundata.* Formen mere regelmæssig convex, Bagenden mindre udtrukken, mindre caudat, mindre udpræget vinkelbøjet eller med afstumpet Køl, som fra Hvirvlen løber ned til Bagrandens mest fremspringende Punkt. Hvirvlen mindre fremragende, Skulpturen særdeles regelmæssig.

2) Var. *subtriangularis.* Temmelig nær ved Typen, men kortere og mere convex paa Midten; mere vinkelbøjet bagtil; meget tykskallet; maaske svarende til var. *crassior* Cocc.

3) Var. *umbonata.* Formen særdeles kort og forholdsmæssig meget høj, meget uregelmæssig convex, med stærkt fremragende Hvirvel.

Ved Sammenligning mellem de forskellige Eksemplarer er det lykkedes Cerulli-Irelli at henføre saavel *Tapes decipiens* Doederl.

---

[1]) Cerulli-Irelli, S. 1908: Fauna malacologica mariana. Parte seconda. Estratto dalla Palaeontolographia italica. Memorie di Paleontologica. Pisa. Volume XIV, p. 137.

som *Tapes caudata* D'Anc. til denne særdeles variable Art *T. senescens*.

Sammenligner man nu disse Beskrivelser med den kortfattede Diagnose, jeg har givet af *Tapes aureus* var. *eemiensis* vil man finde, at netop de Karakterer, der skal udmærke dem hver især, er fælles: den tumide, bagtil mere eller mindre udtrukne Skal, de høje temmelig stærkt krummede Hvirvler og fremfor alt den ejendommelige Skulptur med de paa Skallens bageste Del stærkt uregelmæssig bølgeformede eller rynkede Furer. Kommer hertil Skallernes betydelige Størrelse og forholdsvis store Tykkelse (der dog gennemgaaende er noget mindre hos Eksemplarerne Nord for Alperne) vil man — naar Hensyn tages til Artens store Variationsevne — finde, at der er Momenter nok til at opfatte disse to Arter som identiske. Dette fremgaar maaske endnu tydeligere af vedføjede Afbildninger af Eksemplarer fra forskellige Lokaliteter i Slesvig, Holland og Italien (se Tavle V og VI).

Af de Eksemplarer, jeg har haft Lejlighed til at undersøge i Italien, skal jeg fremhæve følgende:

Fire hele Eksemplarer fra Rimessola (Monte Mario, ca. 5 km. NV. for Rom) afviger fra de fynske og slesvigske Eksemplarer ved Skallernes Tykkelse og Forholdet mellem Bredde og Længde samt ved den temmelig grove, for det blotte Øje særdeles tydelige Radialstribning, omend der ogsaa her gør sig en Del Variation gældende. I alle andre Henseender var der ingen Forskel at spore udover det rent individuelle. Enkelte Fragmenter fra Stensigmose paa Broagerland passede, naar de lagdes direkte paa Skaller fra Rimessola, fuldstændigt i Form og Skulptur. Den karakteristiske Skulptur paa Bagenden er ligesaa varierende hos de fire Stykker som hos de nordiske Eksemplarer.

Fra Malagrotta (ca. 10 km. V. for Rom) har jeg set adskillige Stykker, desværre gennemgaaende stærkt afskallede. De er som Regel noget mindre end, hvad jeg har set fra andre Lokaliteter. Formen er yderst variabel, snart lang og temmelig flad, snart kort. Adskillige er særdeles tykskallede. Hos de Eksemplarer, hvis Over-

flade var nogenlunde bevaret, iagttoges den samme Udviskning af den karakteristiske Skulptur, som kan ses paa nogle af Stykkerne fra Broager.

Fra Pontedera (Prov. Pisa) har jeg set et helt Eksemplar og en enkelt Skal. Denne sidste er 58 mm. lang og har tilhørt et Eksemplar af c. 35 mm. Bredde. Bortset fra Skallens Tykkelse stemmer den fuldstændig overens med Eksemplarer fra Tønder. Det hele Eksemplar er 60 mm. langt, 50 mm. højt og 37 mm. bredt; det er tydeligt radialstribet og den karakteristiske Skulptur er tydelig men af ringe Udstrækning.

Blandt Eksemplarer fra Peccioli var det ene 36,5 mm. langt, 31,5 mm. højt og 20,5 mm. bredt; det var i Formen ganske *Tapes aureus*-agtigt, men den karakteristiske Skulptur var særdeles veludviklet. Radialstribningen derimod meget svag.

Iøvrigt skal her gives nogle Maal:

	Long.	Alt.	Crass.
Italien:	70 mm.	60 mm.	40 mm.
	64,5 —	52 —	40 —
	61 —	48 —	40 —
	57,8 —	46 —	35,5 —
	57,5 —	47,5 —	35,5 —
	47 —	37 —	26 —
Holland:	61 —	45 —	30 —
	47 —	36 —	25 —
	42 —	29,5 —	23 —
	32 —	24 —	17 —
Slesvig (Tønder):	58 —	42 —	30 —
	50 —	40 —	26 —
	40 —	31 —	20 —
Slesvig (Stensigmose):	64 —	49 —	31 —
	61 —	42 —	30 —
	53 —	40 —	30 —
Danmark:	64 —	47 —	34 —
	61 —	44 —	28 —

Synonymien for *Tapes senescens* Doederl. bliver da følgende:

1865. *Venus* cfr. *pullastra* Mtg. G. Berendt: Marine Diluvialfauna in Westpreussen. Schriften der kgl. phys.-ökonom. Gesellsch. zu Königsberg. VI. Jahrg.

1867. *Venus virginea* L. G. Berendt (fide Lovén): Nachtrag zur marinen Diluvialfauna in Westpreussen. Ibidem. VIII. Jahrg.

1873. *Tapes senescens* Doederl. Cocconi: Enum. Moll. mioc. plioc. Parma e Piacenza.

1882. *Venus virginea* L. A. Jentzsch: Die Lagerung der diluvialen Nordseefauna bei Marienwerder. Jahrb. d. kgl. preuss. geol. Landesanst. für 1881.

1882. *Tapes decipiens* Doederl. A. Zuccari: Catalogo dei fossili dei dintorni di Roma.

1886. *Venus sp.* H. Schröder: Ueber zwei neue Fundpunkte mariner Diluvialconchylien in Ostpreussen. Jahrb. d. kgl. preuss. geol. Landesanst. für 1885.

1887. *Tapes caudata* D'Anc. G. Ponzi e R. Meli: Molluschi fossili del M. Mario presso Roma. Atti R. Acc. d. Lincei, Vol. 3, serie 4 a.

1887. *Tapes virgineus* L. var. *major*. J. Lorié: Le Diluvium plus récent ou sableux et le Système eemien. Archives du Musée Teyler. Haarlem.

1891. *Tapes aureus* Gm. „Grand forme". Bucquoy, Dautzenberg, Dollfus: Les mollusques marins du Roussillon. Paris. 1881—98.

1900. *Tapes aureus* Gm. P. Harder (fide V. Nordmann): En ny sønderjysk lokalitet for marint diluvium. Meddel. Dansk geol. Foren. Kbhvn. Bd. I. No. 6.

1900. *Tapes virginea* L. W. Wolff: Aufnahmeergebnisse in der nordöstlichen Kassubei. (Blatt Prangenau und Gr. Paglau). Jahrb. d. kgl. preuss. geol. Landesanst. für 1900.

1904. *Tapes aureus* Gm. C. Gottsche: Der Tapes Sand von Stensigmoos. Monatsberichte d. deutsch. Geol. Gesellsch. No. 10.

1908. *Tapes aureus* var. *eemiensis*. n. v. V. Nordmann: Molluskfaunaen i Cyprinaleret og Mellemevropas andre Eem-Aflejringer. Kbhvn.

1908. *Tapes senescens* Doederl. S. Cerulli-Irelli: Fauna malacologica mariana. Palaeontographia italica. Vol. 14.

Arten er kendt fra mange Lokaliteter i Nord-Italien, af hvilke her skal nævnes: Rimessola, Malagrotta, Magliana, Casale del Merlo, Castellaccio (alle i Monte Mario-Komplekset NV. f. Rom), Caneto (Prov. Roma), Pontedera (Prov. Pisa), Peccioli (Prov. Toscana), Citta delle Piere (Prov. Umbria), Castenedolo (Prov. Lombardia).

Hvad nu Slægtskabet mellem *Tapes senescens* og den ægte *Tapes aureus* Gm. angaar, saa maa jeg ærligt tilstaa, at jeg ikke kan komme til fuld Klarhed over, hvorvidt der er tilstrækkelig Grund til at skille *Tapes senescens* fra *T. aureus* som en egen Art. A priori skulde man synes, at Forskellen mellem den store *Tapes senescens* og den i Almindelighed meget mindre *T. aureus* var stor nok, men ser man nøjere til, bliver det i Virkeligheden kun Skallernes Sværhed, Størrelsen og den karakteristiske Skulptur paa Skallens bageste Del, der danner Forskellen. Og ingen af disse Faktorer er tilstrækkelig stabile. At Formen er meget variabel hos *Tapes senescens* fremgaar tilstrækkeligt af det foregaaende; at den ogsaa hos *Tapes aureus* er overordentlig variabel, er en bekendt Sag, og i Virkeligheden kan man hos begge „Arter" træffe Individer, der i Form er ganske ens (se Tavle VI Fig. 3 og 5). Ogsaa de spæde Ungers Form er ens hos begge. Hvad Størrelsen angaar, saa er den jo i Virkeligheden et meget daarligt Kendetegn, aldenstund der kan gives smaa udvoksne Eksemplarer af *Tapes senescens* og forholdsvis meget store Eksemplarer af *Tapes aureus*. Bucquoy, Dautzenberg og Dollfus anfører som største Maal for *Tapes aureus* mut. *major* 38 mm. Længde, men det største danske (alluviale) Eksemplar er 43 mm. langt. Her kunde ogsaa erindres om, at hos andre Arter (f. Eks. *Tapes decussatus*) kan man lokalt finde Individer, som langt overgaar Artens sædvanlige Størrelse. Hvad endelig Skulpturen angaar, saa er den ogsaa meget varierende. Radialskulpturen kan nok hos *Tapes senesceus* være meget i øjnefaldende, men i Almindelighed er den ikke mere fremtrædende end hos *Tapes aureus*, hvor den ogsaa kan variere stærkt. Tilbage bliver da den karakteristiske, rugose Skulptur paa den bageste Del af Skallen, men, som gentagne Gange fremhævet,

kan denne Skulptur indskrænkes til et meget ubetydeligt Omraade, ja endog helt forsvinde, og i saa Tilfælde er det — navnlig hvis de paagældende Individer er smaa — ikke muligt med Bestemthed at sige, om man har den ene eller deu anden Art for sig. Vanskeligheden forøges ved, at den typiske *Tapes aureus* anføres fra de selv samme og endnu ældre Lag end *Tapes senescens*. For Fuldstændigheds Skyld skal jeg pege paa, at jeg hos nogle Eksemplarer af de stærkt concentrisk furede Varieteter af *Tapes aureus*, særlig hos mut. *rugata* B. D. D., har set større eller mindre Antydning af en Skulptur, der noget minder om den hos *T. senescens* (se Tavle VI, Fig. 6).

Med Hensyn til de Aflejringer og deres Alder, i hvilke *Tapes senescens* er funden, saa maa det bemærkes, at her endnu hersker en vis Usikkerhed. Stratigrafien i Monte Mario Komplekset er i Hovedtrækkene følgende [1]):

I. Som Basis for Lagrækken betragtes et mægtigt, hyppigt disloceret Kompleks af blaafarvede Mergellag med Pteropoder, *Conus antediluvianus*, *Limopsis aurita*, *Nucula sulcata*, *Ostrea cochlear*, *Cidaris remiger*.

II. Discordant paa disse følger lokalt en Aflejring af sandet, glauconitholdigt Ler med mange Fossiler: *Dioplodon farnesinæ*, *Terebratula ampulla*, *Turritella tricarinata* o. s. v.

III. Concordant herpaa kommer a) det graa Sand og b) det gule Sand, der tilsammen danner de klassiske, fossilrige Aflejringer, hvorfra Hovedmassen af Monte Marios rige marine Molluskfauna

---

[1]) En mere detailleret Fremstilling findes bl. a. i følgende Arbejder:

Clerici, Enrico 1891: Sul Castor fiber, sull' Elephas meridionalis e sul periodo glaciale nei dintorni di Roma. Bollettino della Soc. geol. italiana. Vol. 10, fasc. 3.

Clerici, E. 1893: La formazione salmastra nei dintorni di Roma. Rendiconti della R. Accadem. dei Lincei. Cl. di scienze fisiche, mathem. e nat. Ser. V. Vol. 2, Semestre 1.

Clerici, E. 1905: Osservazioni sui sedimenti del Monte Mario anteriori alla formazione del tufo granulare. Ibidem., Vol. 14, Semestre 1.

Clerici, E. 1906: Delle sabbie fossilifere di Malagrotta sulla via Aurelia. Ibidem., Vol. 15, Semestre 1.

Ceruli-Irelli, S. 1907: l. c. Parte prima. Vol. 13, p. 67.

er fremdragen. Hertil slutter sig foroven c) et underordnet Lag af Strandgrus med *Corbicula fluminalis*, *Melanopsis*, *Cardium tuberculatum*, *Venus gallina*, *Donax trunculus* o. fl. a.

IV. Derpaa følger et mægtigt Lag af gult Sand og Grus, fattigt paa Fossiler (Østers og *Pectunculus violascens*). I Gruset er fundet sparsomme Rester af *Elephas meridionalis* og *Hippopotamus major*. Dette Sand genfindes ved Malagrotta og undertiden, som f. Eks. ved Gianicolo og Vaticanerhøjen, hviler det direkte paa Pteropodmergelen (I). — Indskudt i, eller paa andre Steder hvilende paa dette fossilfattige Sand findes Linser eller Lag af mere eller mindre sandet, graat og gult Ler (ved Rimessola, Aquatraversa, Casale del Merlo o. a. St.). Ækvivalent med dette Ler er det gule, grusede Sand ved Malagrotta. Disse Dannelser udgør den saakaldte „formazione salmastra“ og er at opfatte som en Slags Lagunedannelse, og det er heri, at *Tapes senescens* forekommer sammen med *Ostrea edulis*, *Pecten sulcatus*, *Mytilus crispus* (= *lineatus*), *Cardium edule* og var. *Lamarcki*, *Lucina lactea*, *Chama gryphoides*, *Tapes decussatus*, *Gastrana fragilis*, *Donax semistriata*, *Solen vagina*, *Scrobicularia piperata*, *Eastoria rugosa*, *Mactra corallina*, *Nassa reticulata*, *Cerithium vulgatum* var. *tuberculatum*, *Bittium reticulatum* var. *paludosum*, *Rissoa membranacea* o. a.[1]).

V. Herpaa følger a) et gulligt, sandet Lerlag med Rester af *Posidonia Caulini*, *Quercus*, *Ulmus*, *Populus* og andre Planter, — og b) et snart gulligt, snart rødbrunt Lag af Kvartssand.

VI. Endelig afsluttes Lagserien med forskellige Lag af vulkansk Tuf.

Hvad nu Alderen af disse forskellige Lag angaar, saa anses de vulkanske Tuflag i Almindelighed for kvartære og det fossilrige, gule og graa Sand (III) for øvre pliocænt (den astiske Horisont). Om de mellemliggende Lag kan man diskutere, hvorvidt de skal regnes til det yngste Tertiær eller til Kvartæret. Og det er

[1]) Man erindre, at ogsaa i de hollandske og vestslesvigske Eem-Aflejringer forekommer den sammen med *Mytilus crispus*, *Gastrana fragilis* og andre, for vore nordiske, postglaciale Aflejringer fremmede Arter.

netop disse Lags Alder, der i det foreliggende Tilfælde har størst Interesse, thi mellem disse Lag forekommer jo „la formazione salmastra“ med *Tapes senescens.* Professor De Stefani henfører de „klassiske“ Lag (III) til „Nedre Postpliocæn“ og i Følge velvillig Meddelelse anser Cerulli-Irelli paa Grund af Faunaen disse Lag for at „danne Overgangen mellem Plio- og Pleistocæn.“ Det er selvfølgelig vanskeligt i et varmt tempereret Land som Italien og i et Omraade, der ligger uden for Indlandsisens største Udbredelse, at trække Grænsen mellem Tertiær og Kvartær. Hvis imidlertid de nævnte Forskere har Ret, maa man — i alt Fald for Øjeblikket — opfatte den nu uddøde *Tapes senescens* som en kvartær, omend gammelkvartær Form, hvis rigelige Tilstedeværelse i det nordlige Mellemevropas interglaciale Eem-Aflejringer maa virke yderligere ansporende paa Efterforskningerne efter disses Oprindelse, Udstrækning og Naturforhold. De geologiske Forhold paa de øvrige Lokaliteter i Norditalien, hvor den nævnte Musling er fundet, forekommer mig ikke tilstrækkeligt klarlagte.

Foruden at bringe Carlsbergfondet min bedste Tak, fordi det har sat mig i Stand til paa Stedet at studere saavel Samlingerne i Rom som de geologiske Profiler i Monte Mario, maa jeg ogsaa bringe min hjerteligste Tak til de Herrer Dr. Serafino Cerulli-Irelli ved Universitetets geologiske Institut i Rom og Ing. Camillo Crema ved Italiens geologiske Undersøgelse for den Elskværdighed og Beredvillighed, hvormed de bistod mig og hjalp mig til Rette under mit Arbejde.

Summary.

During the winter 1899—1900 two borings were performed near Tønder (Tondern) in Sleswick; on that occasion marine pleistocene deposits, containing a rich, warm fauna, were found in the depths of 14,8 and 18,8 m. under the surface and of a thickness of c. 10 m. These marine deposits were covered by fluvioglacial sand and rested upon beds of boulder clay and glacial sands. (In later time several other borings in the same part of the country have further established the interglacial age of these marine deposits). The result of these borings near Tønder was published by P. Harder (Meddel. Dansk geol. Forening. Kbhvn. 1900. Nr. 6.) and, assisting him in the determination of the mollusca, I found that the most remarkable species was a big form of the genus *Tapes*, which I then regarded as an unusually great form of *T. aureus* Gm. Later on, in the course of my investigations of certain interglacial marine deposits in Denmark, the Netherlands and Northern Germany, which I gave name of the Eem-deposits (see: Danmarks geolog. Undersøgelse II. Række Nr. 17. 1908) I found that this great extinct species, which hitherto had been known from the Netherlands and West Prussia under the determination of *Tapes virgineus* L., was the most characteristic fossil of these Eem-deposits, and I gave it the name *T. aureus* var. *eemiensis*, considering it as a variety of the *T. aureus*. The diagnosis is reprinted on p. 288.

On my journey in England 1909 I looked in vain for this species among the mollusca from the Crag deposits (perhaps some fragments from the Pliocene St. Erths beds might belong to this species, but the material at hand was very badly preserved); but having made acquaintance with the work of Cerulli-Irelli: Fauna malacologica mariana. Palaeontographia italica. Vol. 14. Pisa

1908, I found that his description and figures of *Tapes senescens* Doederl. from Northern Italy agreed with that of *T. eemiensis.* Having now (1912) in Rome examined the specimens of the true *T. senescens* from the vicinity of Monte Mario near Rome and from other places in Italy (see p. 291—94), I must maintain that the *Tapes senescens* and *T. aureus* var. *eemiensis* are identical.

Tapes senescens Doederl. is for the first time described and figured by Cocconi from some specimens in the Museum of Parma, denominated by Prof. Doederlein, and his diagnosis is reprinted on p. 289. He, as well as Cerulli-Irelli, lays stress on just the same characters as I have done for *T. eemiensis*: the tumid scape, more or less produced or caudate in the posterior end, the prominent and recurved beaks and above all the characteristic irregular (rugosa) sculpture on the posterior part of the valve. — The relationship between *Tapes senescens* and *T. aureus* s. str. is not cleared up in a satisfactory manner. The best distinction marks are the size and the sculpture, but they are both very variable and the rugose sculpture can be greatly diminished and nearly obliterated.

The age of the North-Italian deposits, in which *Tapes senescens* is found, is not definitely established. In the neighbourhood of Rome it is found in some lagoon deposits (sand or clay), younger than the classic, fossiliferous marine beds of Monte Mario, but older than the strata of volcanic tuff. The classic beds are considered as belonging to the Upper Pliocene or "Lower Pleistocene" (De Stefani) or forming a passage from Plio- to Pleistocene (Cerulli-Irelli), and the volcanic tuff is of pleistocene age. With regard to the details in the succession of the deposits at Monte Mario, see the litterature quoted on p. 295, Note 1.

Tavleforklaring.

Tavle V.

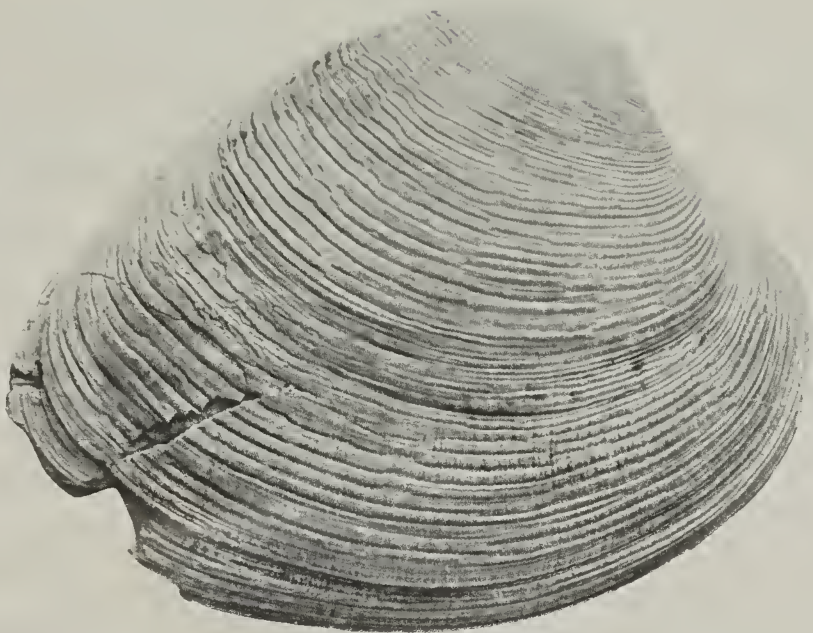
Fig. 1 og 2.	*Tapes senescens* Doederl.	Pleistocen? Peccioli, Italien.
— 3.	— — —	Intergl. Eem-Aflejring, Alkmaar, Holland.
— 4.	— — —	Intergl. Eem-Aflejring, V. f. Haarlem, Holland.
— 5 og 6.	— — —	Intergl. Eem-Aflejring, Tønder, Slesvig.

Tavle VI.

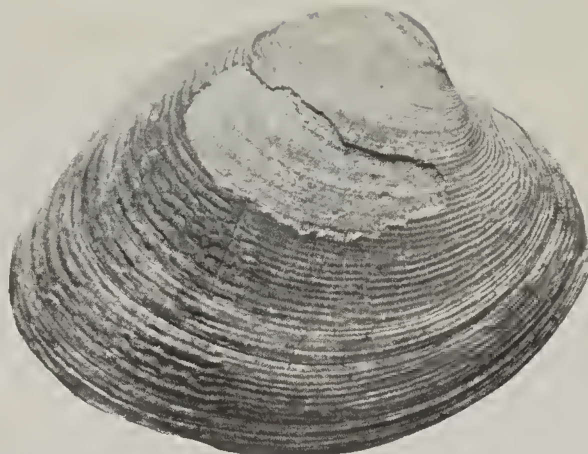
Fig. 1.	*Tapes senescens* Doederl.	Intergl. Eem-Afl. Stensigmose, Broager, Slesvig.
— 2.	— — —	Samme Expl. set ovenfra.
— 3.	— — —	Samme Exp., som paa Tavle V, Fig. 6, set inde fra (efter Harder).
— 4.	— — —	Pleistocen? Malagrotta, Italien.
— 5.	*Tapes aureus* Gm.	Biscayske Hav (efter Harder).
— 6.	*Tapes aureus* mut. *rugata* B. D. D.	Middelhavet.

Alle Figurerne er i naturlig Størrelse.

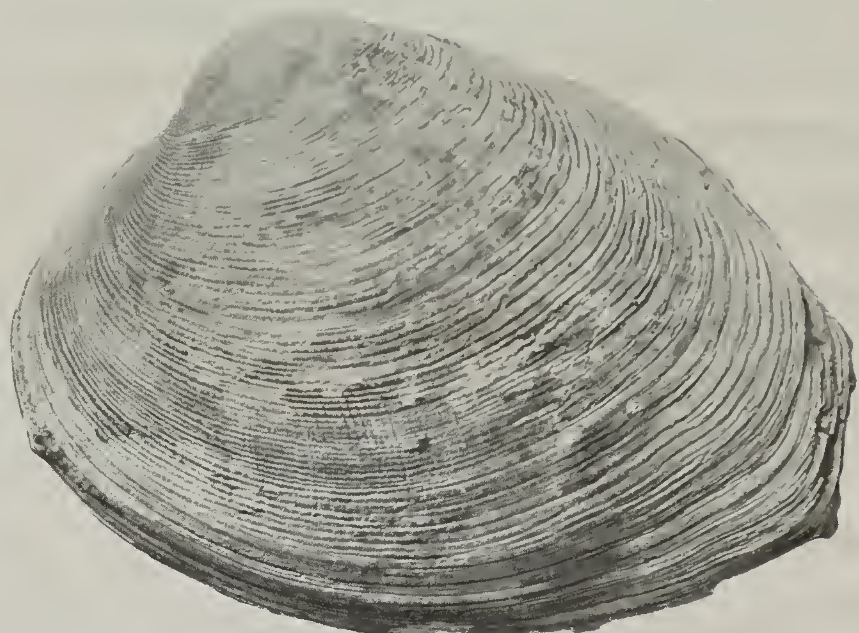
22.—8.—1913.



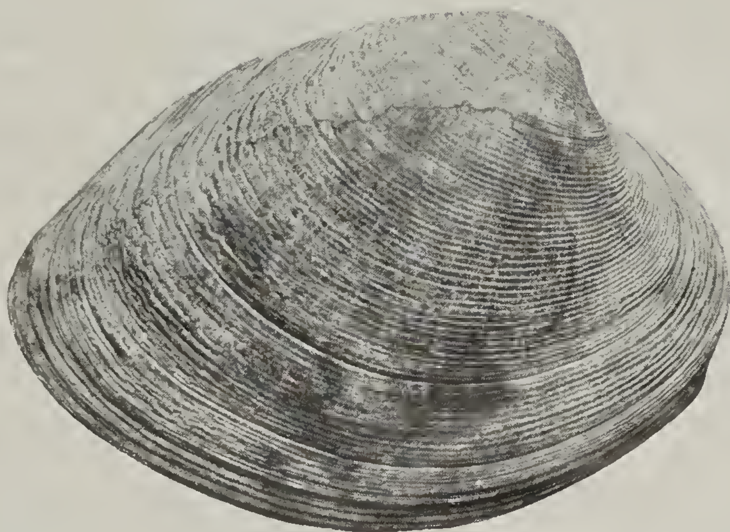
1.



3.



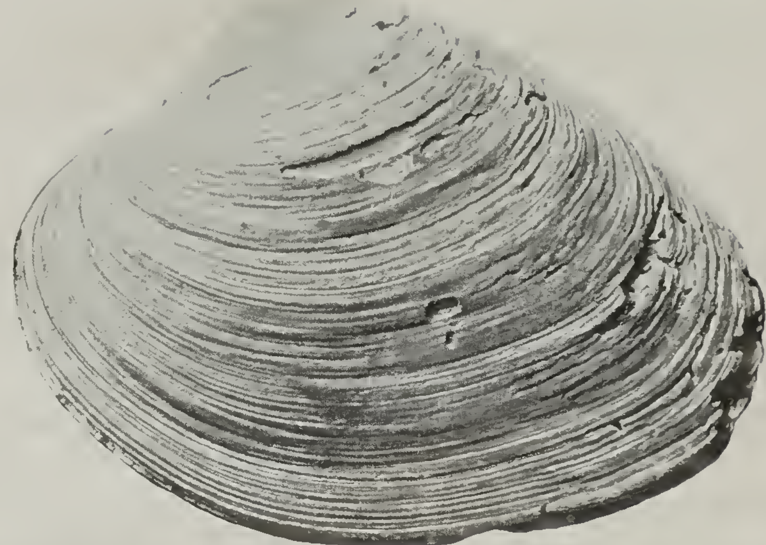
2.



5.



6.

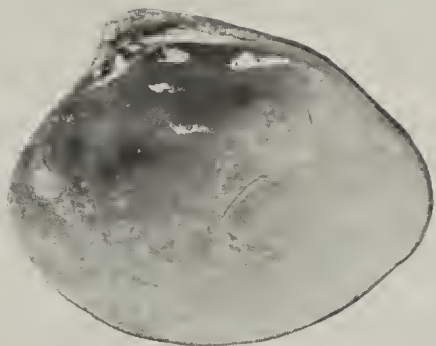


4.

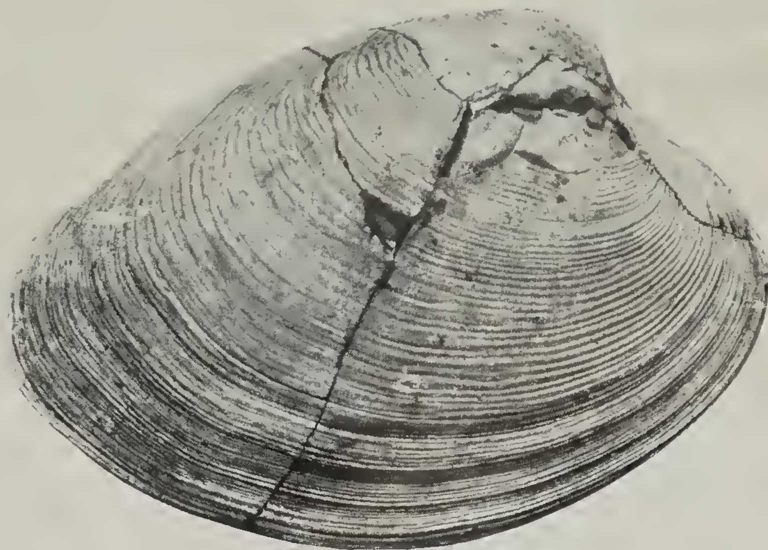
Pacht & Crone phot.

Bianco Luno typ.

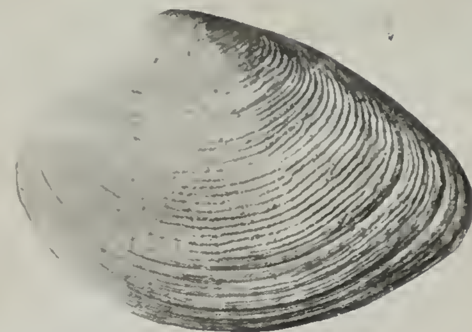
Tapes senescens Doederl. (= *T. aureus var. eemiensis* Nordm.)
1.—2. Italien, 3.—4. Nederlanderne, 5.—6. Tønder.



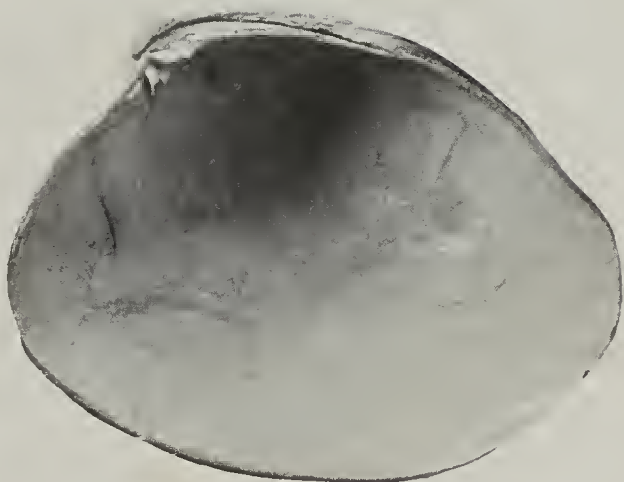
5.



1.



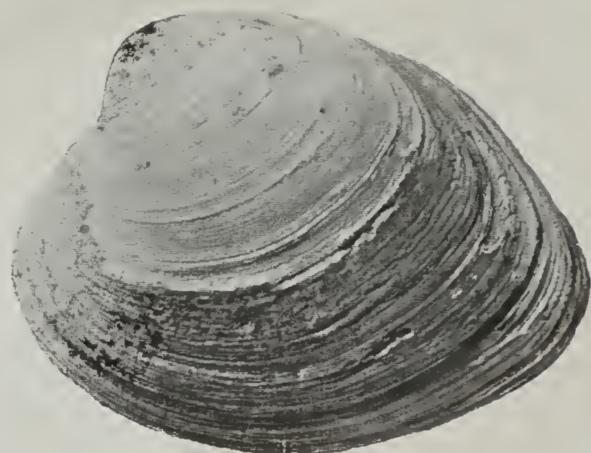
6.



3.



2.



4.

Pacht & Crone phot.

Bianco Luno typ.

Tapes senescens Doederl. (= *T. aureus var. eemiensis* Nordm.) 1.—2. Stensigmose, 3. Tønder, 4. Italien. 5. *Tapes aureus* Gm. Biscayske Hav. 6. *Tapes aureus* mut. *rugata*. B. D. D. Middelhav.

Undersøgelser over entoparasitiske Muscidelarver hos Arthropoder. III[1]).

Af

Dr. *J. C. Nielsen.*

Winthemia xanthogastra Rond.

Udvikling.

Ægget: Æggeskallen er c. 0,5 mm. lang og c. 0,35 mm. bred, langstrakt oval, den bageste Pol noget tilspidset; Undersiden flad, Oversiden fladt hvælvet. Den aabnes ved en vandret Spalte i den forreste Pol.

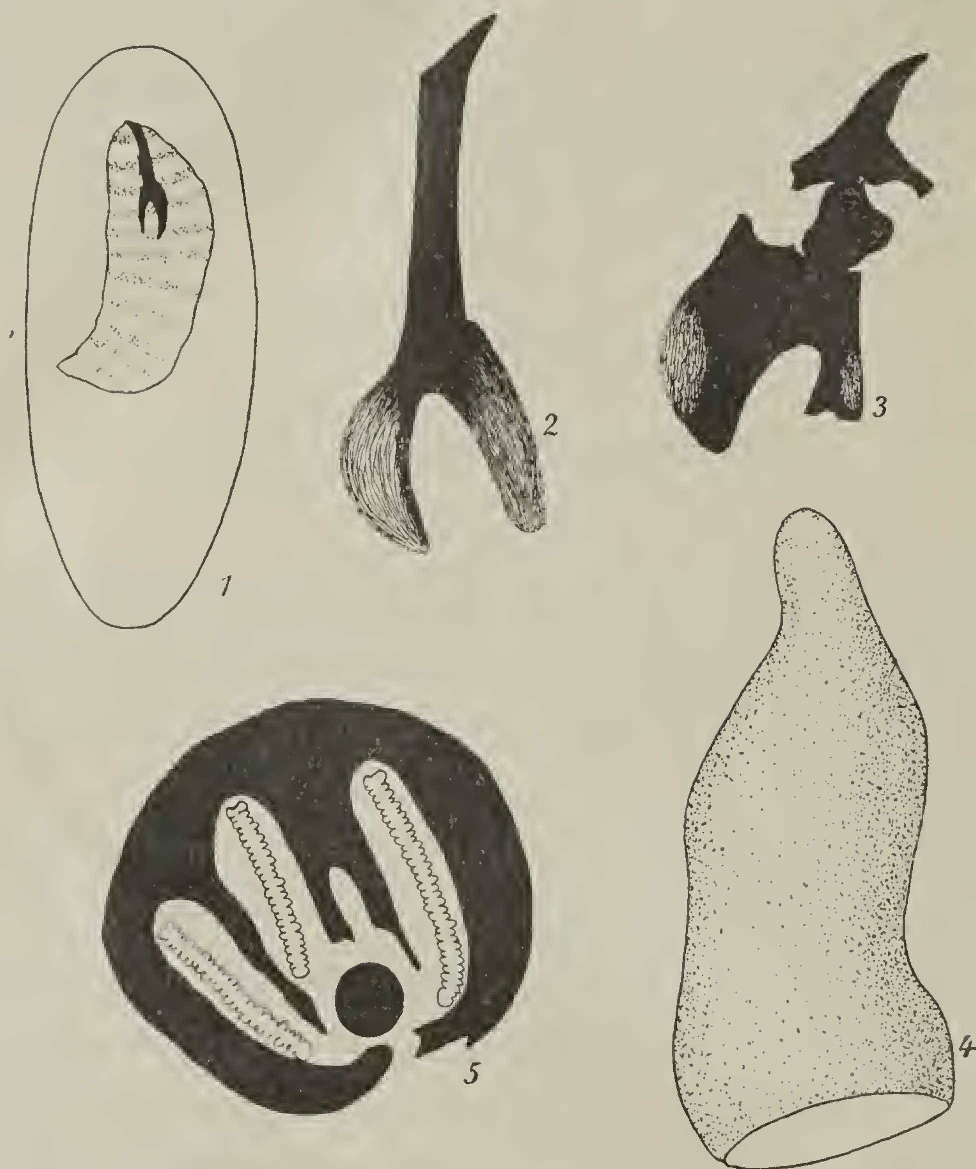
Larven i 1ste Stadium: Længde c. 0,5 mm. Tornbælterne findes paa Forranden af 2.—11. og paa Bagranden af 9.—11. Led; paa 2.—8. Led breder Tornene sig langs Leddenes Sider helt bagud eller næsten helt bagud til Leddenes Bagrand; 12. Led besat med spredte Torne. Svælgskelettets forreste Del, der udgør lidt mere end Halvdelen af hele Svælgskelettets Længde, er lige; Spidsen svagt bøjet, den øverste Rand takket. Bagspiraklernes atrium c. 3 Gange saa langt som bredt, Knopperne temmelig stærkt udvidede og med indskaarne Rande.

2det Stadium: Ukendt.

3die Stadium: L. 8—10 mm. Tornbælterne findes paa Forranden af 2.—11. Led og paa Bagranden af 5.—11. Led, paa 5.—7. Led dog kun paa Bugsiden. Mundkrogenes Rod for og bagtil med en bred, noget bagudrettet, afstudset Udvækst; Spidsen

[1]) I.—II. Vid. Medd. Nat. Foren. Bd. 63. 1911. p. 1. og Bd. 64. 1912. p. 215.

svagt bøjet. De forreste Svælgplader omtrent $^2/_3$ af Mundkrogenes Længde; de bageste omtrent 3 Gange saa lange som de forreste. Forspiraklernes atrium nedtrykt, set forfra omtrent flaskeformet, med en enkelt lille Knop. Bagspiraklerne af den tredelte Type, Rammen aaben ved Tracheeaabningen; Aandefelterne langstrakte og



Winthemia xanthogastra Rond. Fig. 1. Æg med Larve i 1ste Stadium. Fig. 2. 1ste Stad. Svælgskelet. Fig 3. 3die Stad. Svælgskelet. Fig. 4. 3. Stad. Forspiral. Fig. 5. 3. Stad. Bagspirakel.

smalle, temmelig lige. Gattet findes som en stor brunlig Plade ved Forranden af sidste Led.

Tøndepuppen: L. 6—7 mm.; Bredde $2^1/_2$—3 mm.; cylindrisk. Overfladen kraftigt naaleridset, de sidste Led tværrynkede; For- og Bagspiraklerne ikke fremstaaende, de sidste ligger i et noget indsænket Parti; Gattet svagt fremstaaende; de ydre Puppespirakler ikke synlige. Analpapillen danner en tværliggende stor Knude, der er bredere end et Spirakel.

Biologi.

Udover at *W. xanthogastra* Rd. angives som klækket af forskellige Sommerfuglelarver: *Acronycta tridens* Schiff., *Brachonycha sphinx* Hufn., *Catocala sponsa* L. *Smerinthus ocellata* L. og *populi* L. samt *Sphinx ligustri* L. foreligger ingen mig bekendte Meddelelser om dens Levevis[1]). Derimod har Pantel[2]) meddelt nogle Iagttagelser over en anden Art af samme Slægt *W. quadripustulata* F., som ogsaa snylter i Sommerfuglelarver. Dens Æg synes at afvige fra *W. xanthogastra's* ved at være forholdsvis kortere og ikke tilspidsede bagtil. Larven borer sig i Reglen ind gennem Værtens Hud uden at forlade Æggeskallen, i sjældnere Tilfælde efter først at være krøbet ud af dette. Pantel iagttog, at Værten forholdt sig ubevægelig, saalænge Indboringen stod paa, og antager, at Snylteren muligvis udøver en bedøvende Virkning under Indboringen. Snyltelarven fæstedes til Værten ved en fra Indboringshullet Rande udgaaende Tragt.

Jeg har truffet *W. xanthogastra* som Snylter hos Larverne til *S. ligustri* L. og *Deilephila elpenor* L. og fundet Larverne fasthæftede til Værtens Hudskelet ved en Tragt, der udgik fra Huden umiddelbart foran Æggenes forreste Pol. I et Tilfælde, havde en *S. ligustri* Larve forpuppet sig, forinden Snylterne havde dræbt den. Ved Forpupningen havde Puppehuden omsluttet Tragtene og lukket deres Aabninger, saaledes at de ragede ind i Puppen. Dette var dog ikke Tilfældet med nogle Tragte, der udgik fra Sugefødderne eller fra disses Rod, idet disse var fulgt med den afkastede Larvehud. Antallet af de Æg, der afsættes paa en enkelt Larve, kan være meget stort; den ovenfor omtalte *Sphinx*-Puppe, der havde udviklet sig af en Larve, fundet af Docent R. H. Stamm ved Vemmetofte, indeholdt 74 fuldt udviklede *Winthemia*-Larver. Paa

---

[1]) J. K. Tarnani har (iflg. Ref. i Zeitschr. f. Wiss. Insektenbiol. af en Meddelelse i Horæ Soc. Entom. Ross. XXXVII 1894) iagttaget *W. xanthogastra* som Snylter hos *S. ligustri* og fundet indtil 90 Æg aflagte paa en enkelt Værtlarve.

[2]) J. Pantel: Recherches sur les Diptères a larves entomobies I. (La Cellule XXVI 1909).

den afkastede Larvehud sad foruden et Antal tomme Æggeskaller, der svarede til Antallet af de voksne Larver, tillige et ikke ringe Antal Æg, der indeholdt Fostre paa forskellige Udviklingstrin og fuldt udviklede Larver i 1ste Stadium. Dette Forhold gør det rimeligt at antage, at det store Antal Æg ikke hidrørte fra den samme Flue.

Summary.

Winthemia xanthogastra Rond. is found parasitic in the caterpillars of *Deilephila elpenor* L. and *Sphinx ligustri* L. In a pupa of the last named species the funnels of the parasites were found fixed to the inner side of the pupa skin, with exception of the funnels originating from the pseudopods which were attached to the moulted larval skin. In this pupa were found 74 fullgrown larvæ, and on the skin of the host were deposited, besides a number of empty egg-shells corresponding to the number of fullgrown parasites, also a number of eggs containing embryos and first stage larvæ. This feature makes it probable that all the eggs are not originating from the same fly.

Explanation of the figures.

Winthemia xanthogastra Rond.

Fig. 1. Egg with a first stage larva.
— 2. First stage. Pharyngeal skeleton.
— 3. Third stage. — —
— 4. — — Anterior spiracle.
— 5. — — Posterior spiracle.

11.—9.—1913.

Correction to "Echinological Note" VI.

By

Dr. ***Th. Mortensen.***

In the "Echinological Note" VI. "Some abnormalities in Asteroids and Ophiuroids"[1]) I have described (p. 245, Pl. IV. Fig. 4) an abnormal specimen of *Ceramaster* (*Pentagonaster*) *granularis*, which shows, besides a double ambulacral furrow, the unusual feature of having pedicellariæ on some of the paxillæ of the dorsal side. I have thought it not unreasonable to see in this feature a case of atavism, as pedicellariæ are supposed otherwise not to occur in this species, whereas they occur normally in other species of this genus. It was the fact that all the other specimens examined by me had no pedicellariæ, which made me rely on the statement of Verrill[2]) o. a. that pedicellariæ do not normally occur in this species. But, of course, this is no excuse for my omitting to examine more thoroughly the litterature on this species. That pedicellariæ may occur in this species was observed by Ludwig (Seesterne des Mittelmeeres, 1897, p. 180)[3]), and later on Grieg, in his "Michael Sars" Asteroidea I, p. 27[4]), found pedicellariæ to occur in nearly 10 % of the specimens from Norwegian Fjords. In a quite recently published paper "Bidrag til Kundskapen om Hardangerfjordens Fauna" (p. 113)[5]) Grieg has even found pedicellariæ to occur in nearly 50 % of the specimens from the locality Jondal in Hardangerfjord. Accordingly the suggestion that the presence of pedicellariæ in the abnormal specimen represents a case of atavism cannot be upheld.

[1]) Vid. Medd. Dansk Naturh. Foren. This volume p. 241.
[2]) A. E. Verrill. Revision of certain genera and species of Starfishes, with description of new forms. Transact. Connect. Acad. X. 1899. p. 161.
[3]) Fauna u. Flora d. Golfes v. Neapel. Monogr. 24.
[4]) Bergens Museums Aarbog. 1906.
[5]) Ibidem. 1913.

